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American Journal of Hospital Pharmacy

ficial publication of the American Society of Hospital Pharmacists

FORMERLY The BULLETIN

QUALITY CONTROL IN THE PHARMACEUTICAL SERVICE OF HOSPITALS

The American Society of Hospital Pharmacists, an affiliate of the American Pharmaceutical Association, is a national organization devoted to the profession of hospital pharmacy and dedicated to the improvement of pharmaceutical service in the interest of better patient care in hospitals.

MEMBERSHIP in the American Society of Hospital Pharmacists and the American Pharmaceutical Association is open to all practicing hospital pharmacists. With membership are included subscriptions to the American Journal of Hospital Pharmacy and to the *Journal of the American Pharmaceutical Association, Pract. Pharm. Ed.*, as well as the several services of each organization.

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American Journal of Hospital Pharmacy

American Society of Hospital Pharmacists

VOLUME 17 NUMBER 7 JULY, 1960

articles

departments

McKESSON'S ED DuCHARME

The Personal Service you get from McKesson & Robbins is well typified by Ed DuCharme, Hospital Specialist, Providence Division. Born in Providence, he's a member of the American Society of Hospital Pharmacists and the American Hospital Association. He designed the new pharmacy for St. Joseph's Hospital, Providence, and is currently working on pharmacy modernization plans for four other hospitals.

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- spasm of skeletal muscle

a NEW Robins *muscle relaxant-analgesic*

Robaxisal®

ROBAXIN® WITH ASPIRIN

ROBAXISAL, a new dual-acting muscle relaxant-analgesic, effectively treats both skeletal muscle spasm and severe pain due to or associated with the spasm. Each Tablet contains:

- A relaxant component — Robaxin* — widely recognized for its prompt, long-lasting relief of painful skeletal muscle spasm, with unusual freedom from undesired side effects.....400 mg.

  *Methocarbamol 'Robins' U.S. Pat. No. 2770649.

- An analgesic component—aspirin—whose pain-relieving effect is markedly enhanced by Robaxin, and which has added value as an anti-inflammatory and anti-rheumatic agent....(5 gr.) 325 mg.

INDICATIONS: ROBAXISAL is indicated when analgesic as well as relaxant action is desired in the treatment of skeletal muscle spasm and severe concurrent pain. Typical conditions are disorders of the back, whiplash and other traumatic injuries, myositis, and pain and spasm associated with arthritis.

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Also available: ROBAXIN Injectable, 1.0 Gm. in 10-cc ampul. ROBAXIN Tablets, 0.5 Gm. (white, scored) in bottles of 50 and 500.

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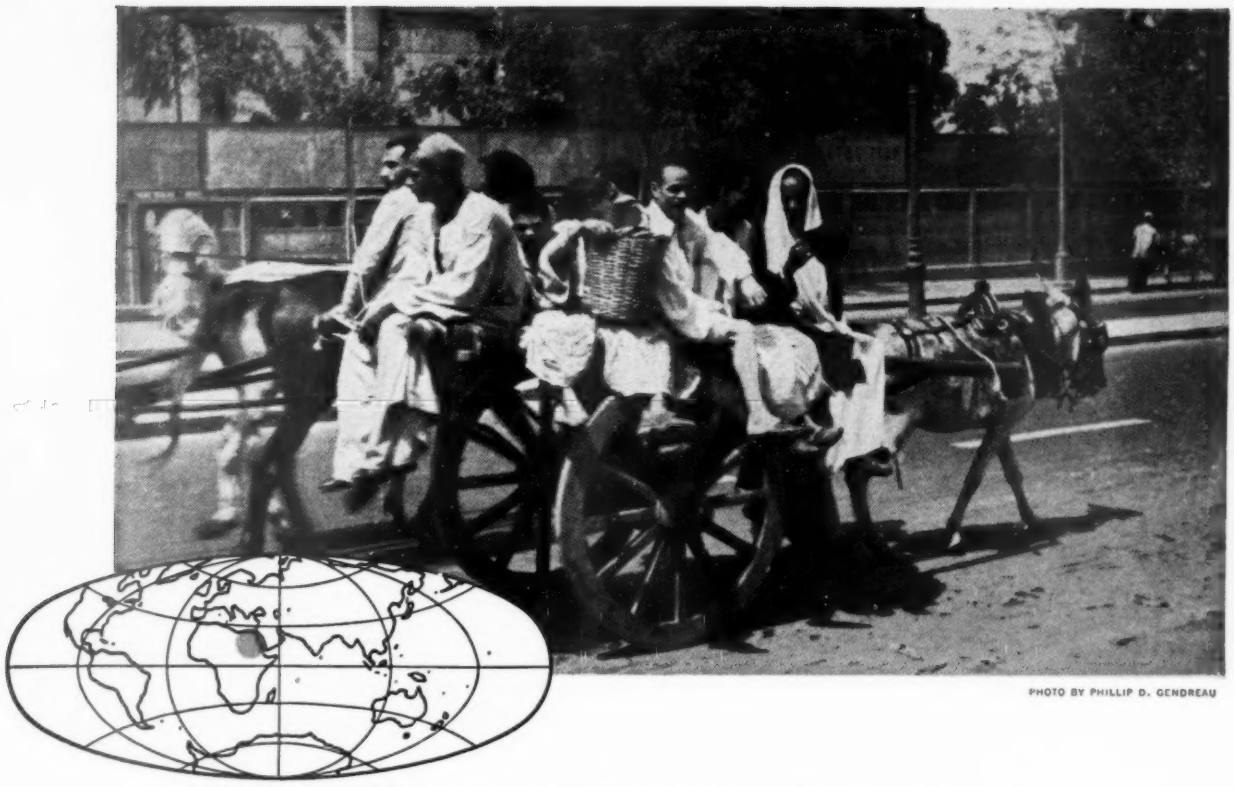

PHOTO BY PHILLIP D. GENDREAU

world-wide evidence favors Furoxone for bacterial diarrheas

In Egypt, Furoxone® effective against shigella strains now resistant to other antimicrobials

Cairo investigators administered FUROXONE for one week to 37 patients with shigellosis, reported all 37 clinically cured, 35 free of shigella prior to completion of FUROXONE therapy.

FUROXONE was tested in light of evidence that shigella strains resistant to sulfonamides, tetracyclines and chloramphenicol now exist. Observations: "All shigella isolated were sensitive in vitro to [FUROXONE]". Clinically, FUROXONE "significantly reduces the duration and severity of the diarrhea and effects bacteriological cure . . . . The absence of toxic or side effects gives [FUROXONE] an advantage not possessed by the other drugs in current use."

Musgrave, M. E., and Arm, H. G.: Antibiotic Med. & Clin. Therapy 7:17 (Jan.) 1960.

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DOSAGE: should provide (in 4 divided doses) 400 mg. daily for adults, 5 mg./Kg. daily for children.

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THE NITROFURANS — a *unique* class of antimicrobials EATON LABORATORIES, NORWICH, NEW YORK

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The Wm. S. Merrell Company
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(brand of triparanol)

...the first cholesterol-lowering agent to inhibit the formation of excess cholesterol within the body.

...reduces both serum and tissue cholesterol levels, irrespective of diet.

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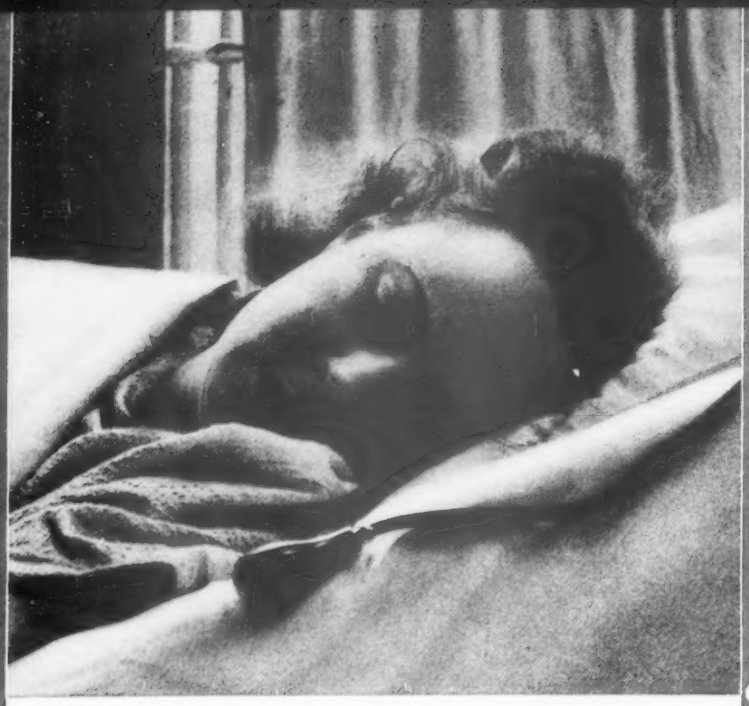

Remarkably effective in the widest range of clinical applications

FOR PAIN

NUMORPHAN®

SUBCUT., I.M., AND RECTAL

In a series[1] of more than 500 consecutive deliveries: "There have been no untoward side effects noted in the mothers, and the incidence of respiratory depression in the infants has been almost negligible, comparing most favorably with other agents."

"There can be little doubt of the efficacy of Numorphan for the control of pain . . ."[2]

1. Sattenspiel, E.: Personal communication. 2. Samuels, M. L.; Stehlin, J. S.; Dale, S. C., and Howe, C. D.: South. M. J. 52:207, 1959.

A NEW ERA IN PAIN RELIEF

clinically tested for 5 years/evaluated in 120 U. S. hospitals/over a quarter of a million doses given/ more than 25,000 patients treated

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*U. S. PAT. 2,806,033

Clinical indications for NUMORPHAN

All conditions in which potent analgesia is required, such as:

DURING LABOR

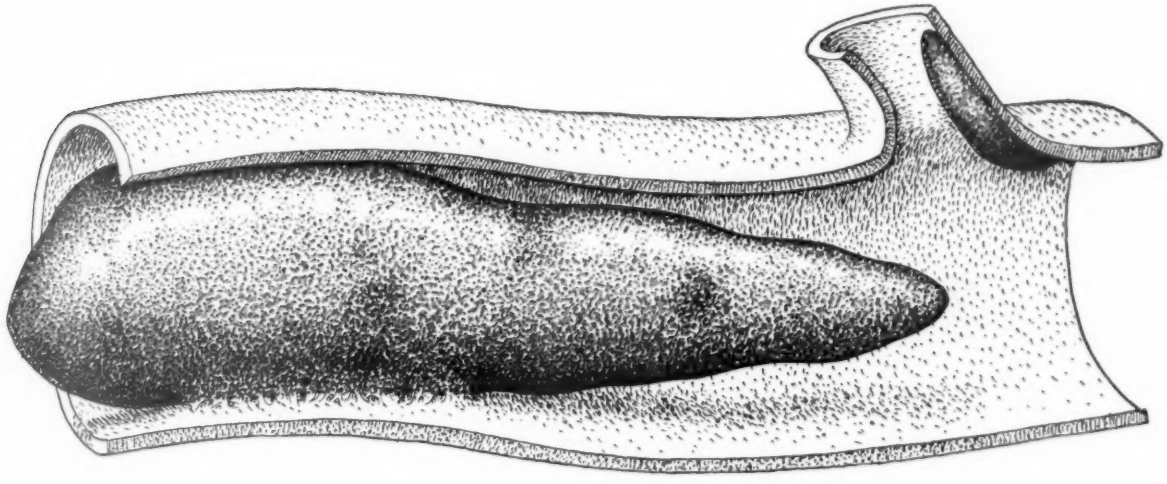
- before and after surgery
- neoplastic diseases
- gastrointestinal, renal, and biliary tract pain
- orthopedic manipulations
- severe burns and trauma
- coronary occlusion with myocardial infarction
- pleuritic pain
- tabetic crises
- radiculitis and other neurologic disorders

Note: Because it possesses little or no cough-inhibiting effect, NUMORPHAN* is the drug of choice for the patient who requires analgesia but must cough.

Available in 1 and 2 cc. ampuls and 10 cc. multiple-dose vials, 1.5 mg. *l*-14-hydroxydihydromorphinone hydrochloride per cc.; rectal suppositories, 2 mg. and 5 mg. May be habit-forming.

Announcing...a new agent for lysis of

VASCULAR THROMBI



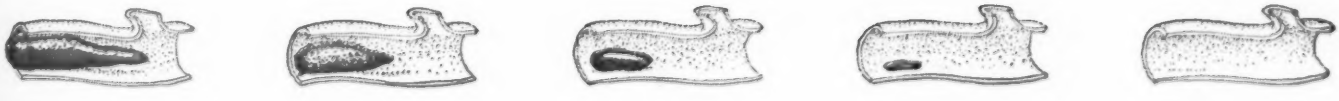
THROMBOLYSIN, supplemented by anticoagulant therapy, can greatly reduce mortality and morbidity in thrombophlebitis, phlebothrombosis, pulmonary embolism, and certain arterial thrombi.* Recently formed clots are lysed rapidly, usually in 24 hours.

to lyse thrombi

THROMBOLYSIN®

FIBRINOLYSIN, HUMAN

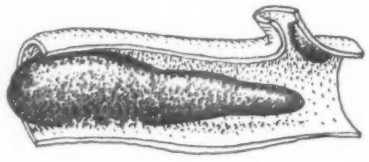
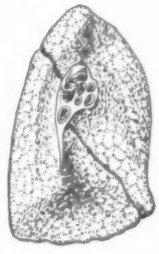
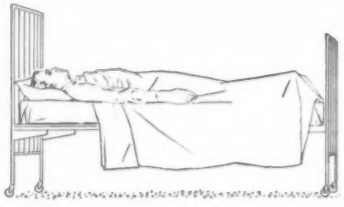
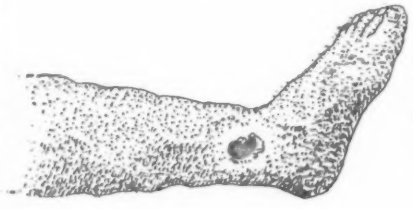
MSD

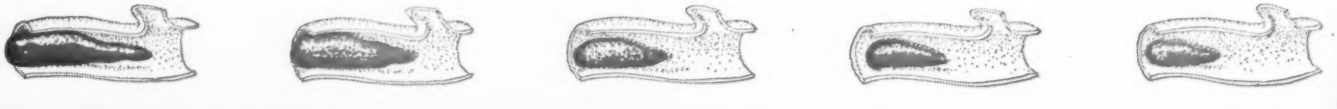


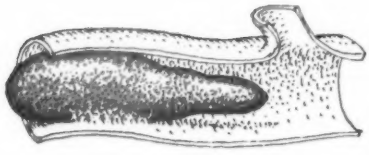
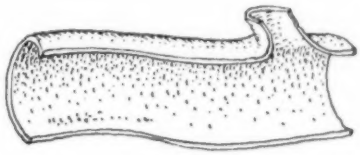
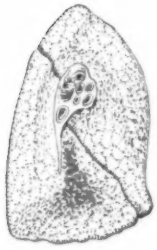
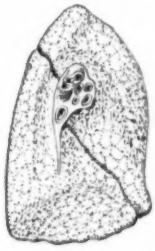
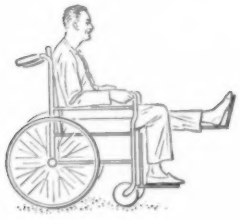
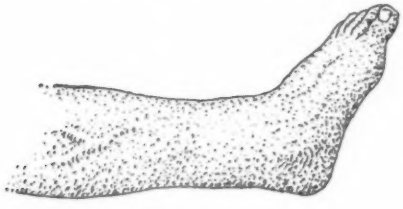
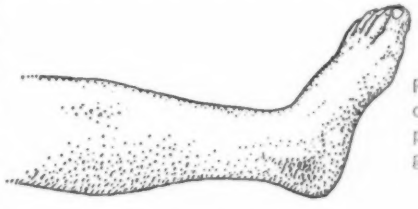
THROMBOLYSIN®

FIBRINOLYSIN, HUMAN

early use greatly reduces morbidity and mortality in thrombophlebitis, phlebothrombosis, pulmonary embolism, and certain arterial thrombi

Results of therapy	Bed rest
Effect on intravascular thrombi	 Clot may form permanent obstruction to blood flow. New clots may form.
Effect on pulmonary emboli	 Sudden death from pulmonary embolism is an ever-present hazard. One or more nonfatal pulmonary emboli may result in irreversible lung damage or secondary pneumonia.
Effect on duration of illness and convalescence	 Weeks of hospitalization or bed rest at home are commonly required in the management of thrombophlebitis, phlebothrombosis, pulmonary embolism, and arterial thrombosis.
Frequency and severity of postphlebitic syndrome	 Chronic leg swelling, severe secondary varicose veins, and leg ulcers are common sequelae.



Anticoagulant + Bed rest	THROMBOLYSIN + Anticoagulant + Bed rest
 Anticoagulants cannot remove formed clot. However, they help prevent its extension and minimize formation of new clots.	 Recently formed intravascular clots are lysed and the formation of new clots is inhibited. Circulation is restored and maintained, with rapid symptomatic relief.
 The careful use of anticoagulants reduces the occurrence of pulmonary emboli.	 The incidence and severity of pulmonary emboli are greatly reduced since THROMBOLYSIN acts to remove thrombi before they can become emboli.
 Thromboembolic illness and convalescence are shortened.	 A striking reduction is observed in the duration of hospital stay, bed rest, and convalescence.
 The incidence and severity of the postphlebitic syndrome are reduced.	 Postphlebitic complications are prevented or greatly minimized.

What is THROMBOLYSIN?

THROMBOLYSIN is Fibrinolysin, Human. It is prepared by activating the profibrinolysin-rich Fraction III – 3 of pooled human plasma with highly-purified streptokinase and then lyophilizing it. THROMBOLYSIN helps restore the natural equilibrium between clot formation and clot lysis, thereby enhancing the ability of the blood to maintain normal flow.

In What Conditions is it Indicated?

THROMBOLYSIN is indicated in thrombophlebitis, phlebothrombosis, pulmonary embolism, and certain arterial thrombi.

*(NOTE: *Successful lysis of thrombi of major cerebral vessels has been reported. However, additional experience is required to define the indications and contraindications of therapy in such patients. THROMBOLYSIN has also been administered to patients with acute myocardial infarction, but the scope of this work is still too limited to permit conclusions about its safety or benefit.*)

When Should Therapy be Initiated?

Treatment with THROMBOLYSIN should be started as soon as possible after a thrombus has formed. Blood clots begin to organize shortly after formation and may become encased in a layer of endothelial cells, making them resistant to the action of THROMBOLYSIN. Usually, more rapid lysis can be expected to take place when treatment is initiated within five days after a thrombus has formed; however, in some cases successful lysis has been accomplished when treatment was not initiated for several weeks after thrombus formation.

Can THROMBOLYSIN be Given to Patients Being Treated with Anticoagulants?

Yes. Patients who have been on anticoagulant therapy can be expected to improve when THROMBOLYSIN is added to their program of treatment.

Does THROMBOLYSIN Increase the Incidence of Embolism?

Clinical studies indicate that it does not. In fact, if any evidence of embolization should appear, it is important to continue THROMBOLYSIN until symptoms have disappeared.

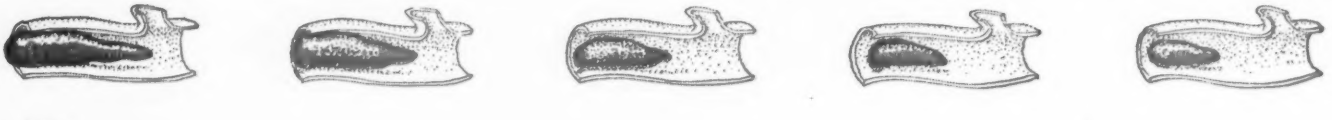
What is the Dosage?

The dosage most frequently used by investigators has been 4 vials (200,000 MSD units) per day by intravenous infusion. This is usually administered by giving 1 vial per hour for 4 consecutive hours. Alternatively, 1 vial (50,000 MSD units) per hour may be given for 2 consecutive hours and repeated in 3 to 6 hours. The dosage range is 1 vial (50,000 MSD units) to 2 vials (100,000 MSD units) an hour, by intra-

Vascular thrombi
can now be
treated rapidly
by a new agent

THRO

For additional information, see package circular or write to Professional Services, Merck Sharp & Dohme, West Point, Pa.



venous drip, for 1 to 6 hours, depending on the nature of the clot and the response of the patient. Most patients respond in one day; those who do not may require additional doses for three or four successive days.

Patients not under active treatment with anticoagulants at the time of the thromboembolic episode:

New clot formation is unlikely to occur during the administration of THROMBOLYSIN, so that anticoagulants may be unnecessary in this period. However, the fibrinolytic activity of THROMBOLYSIN persists only 3 to 4 hours after cessation of infusion; in patients subject to thrombosis, provision should be made to provide adequate therapeutic anticoagulant effect at this time.

Patients under active treatment with anticoagulants:

Within recommended dosages, THROMBOLYSIN produces only minor alterations in the clotting mechanism: the prothrombin time is generally increased by only a few seconds, the Lee-White clotting time by only 1 to 4 minutes, and the fibrinogen levels generally decrease by about 30 percent of control values. In themselves, these alterations are probably of no clinical significance. In patients on concurrent anticoagulant therapy in whom the clotting mechanism is depressed to midtherapeutic levels, the small additional depression due to THROMBOLYSIN should produce no added danger; however, the addition of THROMBOLYSIN may be hazardous when the therapeutic anticoagulant level already threatens to exceed safe limits.

What Other Precautions are Necessary?

THROMBOLYSIN is contraindicated in the presence of a hemorrhagic diathesis or hypofibrinogenemia. Fibrinolytic activity usually increases spontaneously for a short period after anesthesia or surgery. Therefore, THROMBOLYSIN should be used with caution because lysis of the clots at the operative site may occur.

Bleeding from open wounds or recent operative sites can occur during therapy. Usually this has been observed only in patients receiving both an anticoagulant and THROMBOLYSIN. In such cases, the bleeding was controlled by the use of plasma or whole blood transfusions. A specific antagonist to the anticoagulant may also be used.

What Side Effects May Occur?

Febrile reactions may occur, but these are rarely severe. When they do occur, the temperature usually rises rapidly to a peak, then returns to normal within 24 hours. In some patients, a rise in temperature above 1.5 to 2 degrees F. is accompanied by chills, nausea, vomiting, dizziness, headache, muscle pain, back pain, tachycardia, or hypotension.

How is it Supplied? 100-cc. vials containing 50,000 MSD units.

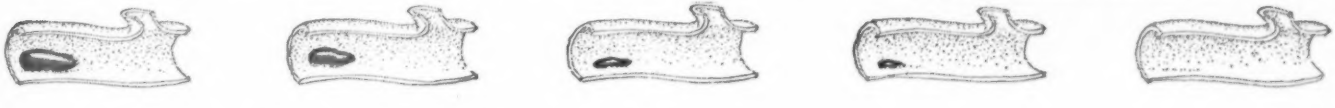
to
lyse
thrombi

OMBOLYSIN®

FIBRINOLYSIN, HUMAN

MERCK SHARP & DOHME, DIVISION OF MERCK & CO., INC., WEST POINT, PA.

THROMBOLYSIN IS A TRADEMARK OF MERCK & CO., INC.



NEW

CARBOCAINE® hydrochloride

(Brand of mepivacaine hydrochloride)

a unique local anesthetic with "...outstanding features."[1]

Carbocaine combines the best characteristics of older local anesthetics with exceptional new advantages.

More potent
than procaine or lidocaine.[2]

•

Quicker onset of anesthesia
than obtained with other agents.[3]

•

More prolonged anesthesia
— lasts several hours.[1,4]

•

Greater safety
—low toxicity, virtually no vasodilatation,[1,5] epinephrine not required except for hemostasis.

•

Local anesthesia extended
to many more
patients and procedures.[4,5]

•

Greater stability
—no risk of decomposition or loss of potency.

Carbocaine has been found suitable for elderly or poor risk patients, for patients with epilepsy or cardiac disease, as well as for many others in whom potent anesthetics are generally contraindicated.

For infiltration and nerve block, caudal and peridural block, and therapeutic block in management of pain.

How Supplied: For infiltration and nerve block: Carbocaine hydrochloride, 1 per cent and 2 per cent, in sterile saline solution, in multiple dose vials of 50 cc. For caudal and peridural block: Carbocaine hydrochloride, 1 per cent, in sterile modified Ringer's solution, in single dose vials of 30 cc.

References: 1. Sadove, M. S.: A preliminary report on Carbocaine, a new local anesthetic. Submitted for publication. 2. Luduena, F. P.; Hoppe, J. O.; Coulston, F., and Drobeck, H. P.: The pharmacology and toxicology of mepivacaine, a new local anesthetic, *Toxicol. & Appl. Pharmacol.* To be published. 3. Rovenstine, E. A.: Personal communication. 4. Young, J. A.: Upper arm block with Carbocaine (mepivacaine), a new anesthetic agent, *Anesth. & Analg.* To be published. 5. Griesser, Gerd: Erfahrungen mit einem neuen Lokalanestheticum, *Anaesthesist* 6:364, Oct., 1957.

Winthrop Laboratories
New York 18, N. Y.

Carbocaine (brand of mepivacaine), trademark reg. U. S. Pat. Off.

enhanced obstetrical analgesia

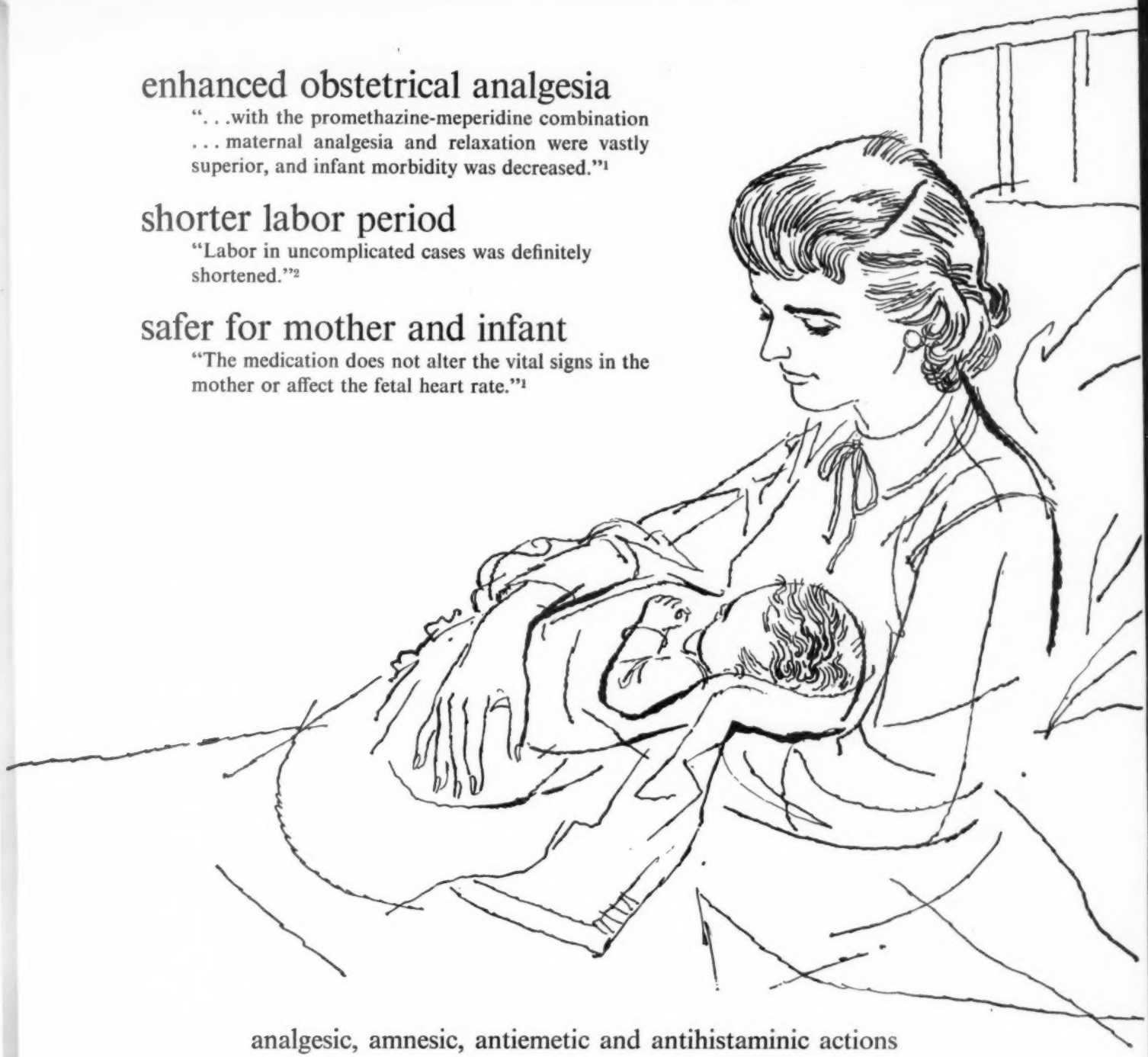
"...with the promethazine-meperidine combination ... maternal analgesia and relaxation were vastly superior, and infant morbidity was decreased."[1]

shorter labor period

"Labor in uncomplicated cases was definitely shortened."[2]

safer for mother and infant

"The medication does not alter the vital signs in the mother or affect the fetal heart rate."[1]



analgesic, amnesic, antiemetic and antihistaminic actions

meperidine-promethazine combined

MEPERGAN®

Promethazine Hydrochloride and Meperidine Hydrochloride, Wyeth

For further information on prescribing and administering MEPERGAN see descriptive literature, available on request.

1. Carroll, J.J., and Moir, R.S.: J.A.M.A. *168*:2218-24 (Dec. 27) 1958. 2. Gordon, L.E., and Ruffin, C.L.: Am. J. Obst. & Gynec. *76*:147-151 (July) 1958.

Wyeth Laboratories *Philadelphia 1, Pa.*

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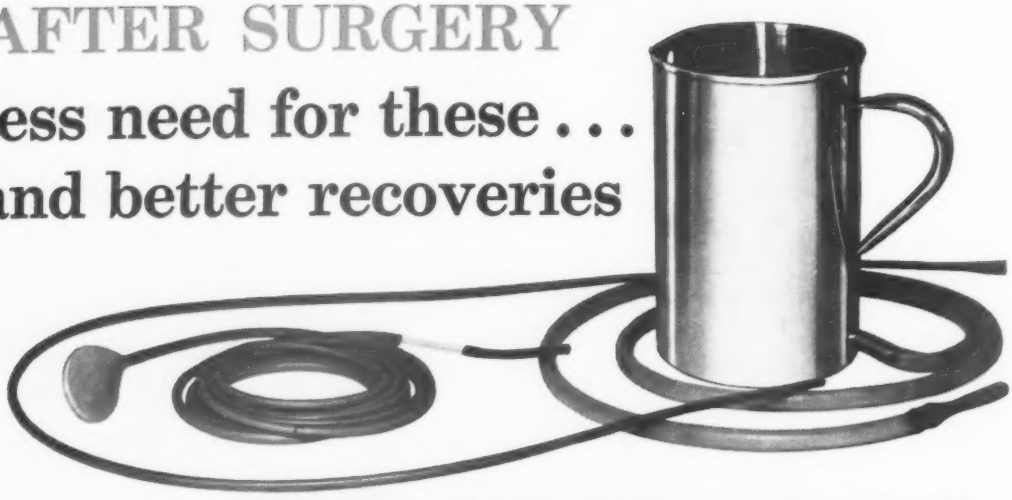
A Century of Service to Medicine

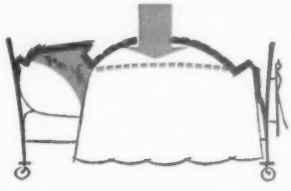
AFTER SURGERY
less need for these . . .
and better recoveries



with ILOPAN

(d-Pantothenyl Alcohol, Warren-Teed)

Surgical stress appears to increase the body's pantothenic acid requirements. ILOPAN (parenteral) provides pantothenic acid—to aid restoration of normal peristalsis—to prevent and relieve postoperative retention of flatus and feces, even paralytic ileus.



In 42 postsurgical patients . . . "Ilopan was responsible for a 50% reduction in number of enemas, and a reduction or earlier withdrawal of catheters and Levin or Cantor tubes. In 213 additional surgical procedures . . . patients on Ilopan . . . an 86% effective improvement"

Kareha, L. G., et al, W. Jour. S.G. & O., 66:220, 1958

"... the (Ilopan) treated patients did do better, especially as to their mental outlook and sense of well-being. They seemed more comfortable, less drugged and in a much better state of mind."

Collins, D., to be published

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Stone, M.L., et al, Amer. J. Surgery, 97:191, 1959

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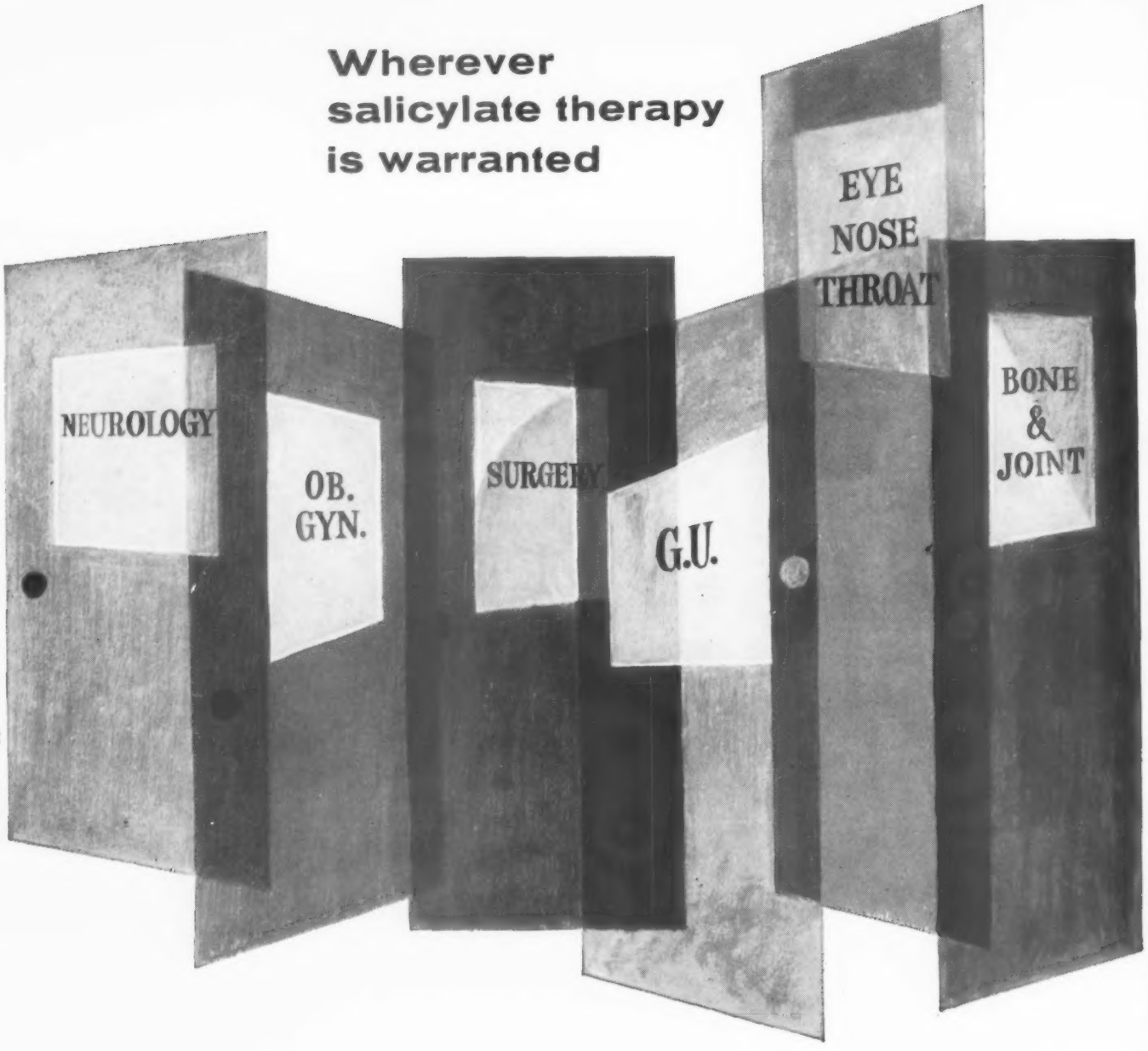

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Southeastern Society

Mr. Perry Cox, Chief Pharmacist at Carraway Methodist Hospital in Birmingham, Alabama, was installed as the President of the Southeastern Society of Hospital Pharmacists at the Annual Meeting held in Miami Beach, Florida May 3 to 7.

Other officers installed were: Mr. Allen Ford, Jacksonville, Florida, *Vice-President;* and Miss Mary Wernersbach, Miami Beach, Florida, *Secretary-Treasurer.*

In its business session, the Society amended its by-laws to provide for a three-year term for the Secretary-Treasurer, and provided a stipend to be paid for services of this office at the end of each year.

The program for the meeting presented a discussion on the administrative and legal problems of hospital pharmacy. The speakers for these sessions were three hospital administrators: Mr. Joseph McAloon, Hollywood, Florida, President of the Florida Hospital Association; Mr. W. E. Arnold, Director of St. Luke's Hospital, Jacksonville, Florida; and Mr. Emmett R. Johnson, Assistant Administrator, Baptist Hospital, Jacksonville, Florida.

Another speaker on the program was Dr. Randall B. Tinker, Assistant Professor of Pharmacy, University of Florida, and a member of the Society. Dr. Tinker gave a report on his studies of the reactions to penicillin and other antibiotics.

Arkansas Association

The Arkansas Association of Hospital Pharmacists held a regular meeting in conjunction with the Hospital Pharmacy Seminar at the University of Tennessee in Memphis April 16.

Business conducted at this meeting included a decision to award to the outstanding student in pharmacology at the University of Arkansas School of Pharmacy, a copy of the *American Hospital Formulary Service.*

In further action taken at this time, the President, Mr. Louis Hauser, was instructed to write to the University of Arkansas School of Pharmacy requesting that a member of the Arkansas Association be selected to represent hospital pharmacy at the pre-pharmacy advisors meetings held for prospective pharmacy students.

Northern California Society

The Northern California Society of Hospital Pharmacists traveled by bus and box lunch to Stockton, California for its 138th regular meeting on May 10. The meeting was held at the School of Pharmacy, College of Pacific.

Dr. David A. Stadner, a former pediatrician and now an allergist, was the speaker for the evening. Dr. Stadner gave a talk illustrated with colored slides describing his trip to India in 1955. He gave an interesting and informative discussion on the various customs and folkways of the natives, and showed several slides of sidewalk pharmacies selling herbs and other commerce.

In its business session, the Society discussed the proposed new Code of Ethics which the State Board of Pharmacy is presenting for public hearings during the month of May. The Society will send a representative to the hearings to present its viewpoint on these new regulations.

Southern California Society

The regular monthly meeting of the Southern California Society of Hospital Pharmacists was held on May 11 at Queen of the Angels Hospital in Los Angeles.

In a ceremony preceding the regular meeting, President Wendell Hill read selections of the history of the Southern California Society dating back to 1924 that had been collected and recorded by the late Sister Junilla. Following the reading a plaque was presented to Sister Aquina, representing the Queen of Angels Hospital, commemorating the Sister Junilla Scholarship Fund.

Colorado Society

The Colorado Society of Hospital Pharmacists met for its regular meeting on May 17 at the Porter Sanitarium and Hospital in Denver.

A report was given on a meeting held by representatives of the health professions to consider legislation in these fields. It was decided at this meeting that they should not, as indi-

Exhibit displayed by the Southern California Society of Hospital Pharmacists at the Annual Convention of the Association of Western Hospitals meeting in Los Angeles, April 25-28. Shown in the photo are Gloria Nomura and David Hirscher, who are both hospital pharmacy residents at the Veterans Administration Center in Los Angeles

FROM ACCEPTANCE SPEECH OF JOSEPH C. LaNIER, PRESIDENT, THE COLORADO SOCIETY OF HOSPITAL PHARMACISTS

. . .Because of your cooperation there are major accomplishments to review. . . .The results were not always what we expected, but we shall keep trying.

. . .Our membership has increased four-fold. We may not be (directly) responsible for all these additional members, but there isn't a single hospital pharmacist that hasn't heard about the Colorado Society of Hospital Pharmacists and what it is trying to do.

. . .In 1960 we are going to work closely with the University of Colorado College of Pharmacy, the Colorado Hospital Association, the Colorado Pharmacal Association, the State Board of Pharmacy, and the Denver Area Drug Association . . . and other interested groups in an effort to do something about the (over) fifty hospitals in this state which operate without the services of a registered pharmacist.

. . .In the coming year we will cooperate closely with the officials responsible for High School Career Day. Where else are we going to get students to study pharmacy, other than from our high schools? And how are they going to know about pharmacy if we who practice it do not tell them?

viduals or as a group, promote legislation, but should approach the problems—particularly the dispensing of medications by non-pharmacists—from an educational point of view. In this manner they would create an atmosphere in which the problems would tend to correct themselves without the need of regulations.

Miss Gloria Arduser conducted an open discussion on the methods of handling after-hours pharmacy service. Representative members were asked to describe their policy in meeting this situation.

Louisiana Society

The Louisiana Society of Hospital Pharmacists held a one-day Seminar at Loyola University on Saturday, April 9. The Seminar was sponsored jointly by the Louisiana Society of Hospital Pharmacists, the New Orleans Chapter of the American Pharmaceutical Association, and Pfizer Laboratories, in cooperation with Loyola University College of Pharmacy.

William P. O'Brien presided over the Seminar as Moderator. Father Thomas Mulcrone delivered the invocation and Dr. Edward J. Ireland welcomed the participants on behalf of Loyola. Greetings were extended by Frank W. Hollister, President L.S.H.P., and Albert J. Bernard, President of the New Orleans Chapter, A.Ph.A.

Outstanding speakers of both the pharmacy and medical professions addressed the Seminar. Highlight of the program was a panel discussion on current research programs in New Orleans, the renowned medical center of the South. Dr. John Walsh, Director of Research, U. S. Public Health Service Hospital, of New Orleans, served as moderator of this panel. Participating were Dr. Vincent Derbes, Professor of Medicine and Chief of the Sections of Allergy and Dermatology, Tulane University; Dr. Sam Threefoot, Director of Research, Touro Infirmary; and Dr. George E. Burch, Professor of Medicine, Tulane University.

ASHP President-Elect Clifton J. Latiolais (right) talks with Dean Edward Ireland, Loyola University (left) and Frank W. Hollister (center) President of Louisiana Society of Hospital Pharmacists, at recent Seminar in New Orleans

Dr. Peter A. Ratto, Professor of Pharmaceutical Chemistry, Loyola University, School of Pharmacy, lectured on, "The Inconsistency of Chemical Naming of Drugs." Dr. G. Ralph Smith, Professor of Business Administration at Loyola University, spoke on, "Internal Communications." A practical demonstration in Emergency First Aid Skills and Techniques was given by the Senior Pharmacy Class of Loyola under the direction of Instructor William P. O'Brien.

The guest speaker at the Seminar was Loyola Pharmacy School graduate Clifton J. Latiolais, Director of Hospital Pharmacy, Ohio State University and President-Elect of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. His topic was, "Utilizing Statistics in Hospital Pharmacy."

The Seminar was followed by a banquet at the U. S. Coast Guard Officers Club on Saturday Night.

Maryland Association

The May 19 meeting of the Maryland Association of Hospital Pharmacists was held at the Clinical Center, National Institutes of Health, Bethesda, Maryland.

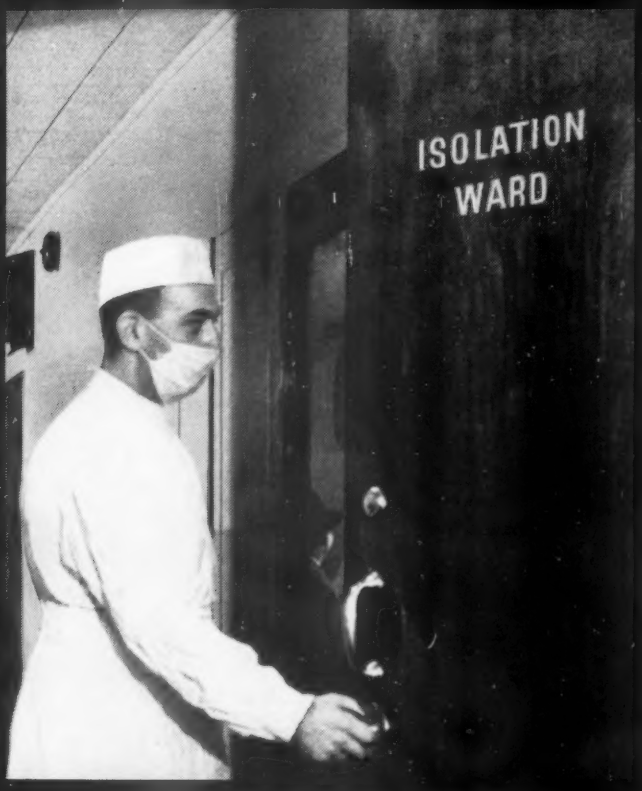
The theme of the meeting was "The Use of Radiopharmaceuticals in Hospitals." A motion picture entitled "Radiopharmaceuticals from Reactor to Physician" was shown. This picture, along with some slides which were also shown, were made available through the courtesy of the University of Chicago Clinics.

Massachusetts Society

Eighty-seven hospital pharmacists had the unusual opportunity to hear from two national presidents at their May meeting. Dr. Howard C. Newton, President, American Pharmaceutical Association, and Mr. Vernon O. Trygstad, President, AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, discussed the functions and operations of their respective organizations and offered a view to the future and developments to come.

The meeting was held at the Veteran's Administration Hospital in Brockton.

New officers of the Massachusetts Society of Hospital Pharmacists for 1960-1961 are as follows: *President,* Mr. John



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REFERENCES 1. Glas, W. W., and Britt, E. M.: Proceedings of the Detroit Symposium on Antibacterial Therapy (Michigan and Wayne County Academies of General Practice, Detroit, Sept. 12, 1959), p. 7. 2. Mann, P. H.: Antibiotics & Chemotherapy 10:93, 1960. 3. Christenson, P. J., and Tracy, C. H.: Current Therapeutic Research 2:22, 1960. 4. Investigators' reports to the Medical Department, Eaton Laboratories. 5. Leming, B. H., Jr.: Proceedings of the Detroit Symposium on Antibacterial Therapy, 1959, p. 19. 6. Prigot, A.; Felix, A. J., and Mullins, S.: Ibid., p. 85. 7. Lysaught, J. N., and Cleaver, W.: Ibid., p. 63.

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Webb, Massachusetts General Hospital, Boston; *Vice-President,* Mr. George R. Zager, McLean Hospital, Waverly; *Secretary,* Mr. James J. Durkee, Children's Hospital Medical Center, Boston; and *Treasurer,* Mr. John H. Kelley, Jordan Hospital, Plymouth.

Mississippi Society

The Mississippi Society of Hospital Pharmacists held a regular meeting on April 27.

Mr. Ernest Gentry, District Director of the Bureau of Narcotics, was the guest speaker. Mr. Gentry spoke on the specificity of federal narcotic laws and state narcotic laws, stressing the point that the state laws are considered the more regulatory of the two, while the federal laws are more generalized. The state laws constitute the real control of narcotics within the state.

Narcotic drug control methods yielding maximum security must be established in the hospital under the supervision of the hospital pharmacist, Mr. Gentry said. He stressed the hospital pharmacist's responsibility in this matter. This can be implemented by fixing and confining control to as few persons as possible. Mr. Gentry commended the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS for its efforts in evolving a uniform, effective system of control which could be profitably adopted by any hospital.

Greater Kansas City Society

The Society of Hospital Pharmacists of Greater Kansas City met for its regular meeting on April 4.

The program was devoted to a discussion of topics for future meetings. Among those topics discussed were pricing and crediting medication, functions of the Pharmacy and Therapeutics Committee, methods of handling ward stock supplies, and displays by drug manufacturers. A great deal of interest was shown in a program dealing with the establishment of a uniform policy for crediting medication returned to the pharmacy.

New Jersey Society

The installation dinner and regular business meeting of the New Jersey Society of Hospital Pharmacists was held at the Alexian Brothers Hospital in Elizabeth on May 19.

Dean Roy A. Bowers of the Rutgers College of Pharmacy installed the new officers: *President,* Mrs. Florence Frick; *Vice-President,* Mr. Henry Roche; *Secretary,* Miss Joyce Dolecki; and *Treasurer,* Mr. Victor Ern.

Mr. Eugene Von Stanley gave a report of the proposed changes in the Pharmacy Act during the business meeting. Among these new changes is one that would put all hospitals under a total bed capacity of fifty under the jurisdiction of the State Board of Pharmacy. Mr. Von Stanley represented the Society at a meeting held to consider these proposals.

Southeastern New York State

The April 20 meeting of the Southeastern New York State Chapter was held at Mt. Sinai Hospital in New York City. Professor Joseph Kanig of Columbia University School of Pharmacy spoke on "The Mechanism of Sustained Release

Products." He traced the history of the development of these products, enumerated some of the problems and disadvantages, and then offered some possibilities as to the future forms of sustained release medication.

Western New York Chapter

The March meeting of the Western New York Chapter of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS was held at the Kenmore Mercy Hospital. Dr. Joseph Masterson of the staff of Kenmore Hospital was the guest speaker. Dr. Masterson used as his topic "Medicinals Used in the Treatment of Fungal Infections."

Dr. Alexander Slepian was the speaker for the April 26 meeting, held at the Niagara Falls Memorial Hospital. Dr. Slepian spoke on "Drugs Finding Use in Neurological Disorders."

Ohio Society

The Ohio Society of Hospital Pharmacists installed Mr. Thomas E. Sisk, of Lorain, Ohio, as its President for the new Society year. Other officers elected were: *Vice-President,* Miss Alice Banachowski, Riverside Hospital, Toledo; *Secretary,* Mr. Eugene Hovis, Massillon City Hospital, Massillon; *Treasurer,* Miss Hildah Douglas, Akron; and *President-elect,* Mrs. Jeanette Sickafoose, East Sparta.

The new officers were installed by Mr. Theodore Mink, the retiring President, at the final business session of the Spring meeting of the Ohio Society.

Cleveland Society

A regular meeting of the Cleveland Society of Hospital Pharmacists was held at Forest City Hospital on March 30.

As a result of the recent deaths due to the mistaken use of boric acid solution, a discussion was held on the methods of handling this preparation in hospitals. It was agreed that, where boric acid solution is used, there should be a definite distinction between the containers used for this preparation and those used for distilled water.

Dr. Esque Crawford of the staff at Forest City Hospital was the guest speaker for the evening. He spoke on the uses of anesthesia in obstetric cases.

The April 27 meeting of the Cleveland Society was held at the Cleveland Clinics Hospital. The program at this meeting was a film, "The Effect of Viruses on Detroit 6 Cells," presented through the courtesy of Parke, Davis and Company.

Western Pennsylvania Society

The Western Pennsylvania Society of Hospital Pharmacists met at the University of Pittsburgh School of Health Professions on April 28 for its regular monthly meeting. The Society had decided earlier that at least one meeting during the year should be on a subject or program apart from pharmacy and the allied disciplines. The April program was in keeping with that decision.

The speaker for the evening was Mr. Ronald McHall, Director of the Pitt Players, and Assistant Professor of Speech at the University of Pittsburgh. His subject was "What's On and Off Broadway," in which he discussed some of the current stage productions now being presented in New York City. Mr. McHall gave an enlightening presentation, and this program experiment was termed a success.

Utah Society

On May 21 the Utah Society of Hospital Pharmacists met for its annual dinner meeting for the election of officers. The meeting was held at the Log Haven in Salt Lake City.

Left: New officers of the Utah Society (l to r) are Charles Johnson, President; Sister Mary Rebecca, Vice-President; and Marjorie Hill, Treasurer. The Secretary, Ray Spencer, was absent when the photo was taken. Right: Mr. George Flashman, Staff Pharmacist at the Holy Cross Hospital, was voted an honorary member at a recent meeting of the Utah Society. Mr. Flashman was the first president of the group

The following people were elected to office: *President*, Mr. Charles Johnson, Veterans Hospital, Fort Douglas; *Vice-President*, Sister Rebecca, St. Luke's Hospital, Ogden; *Secretary*, Mr. Ray Spencer, Latter Day Saints Hospital, Salt Lake City; and *Treasurer*, Miss Marjorie Hill, County General Hospital, Salt Lake City.

The featured speaker at the dinner was Mr. Eldon Frost, Chairman of the Utah State Board of Pharmacy. Mr. Frost spoke on some of the problems encountered by the Board in the enforcement of pharmacy regulations. He also mentioned the desire on the part of the Board to have representatives of hospital pharmacy, along with representatives of allied hospital and pharmacy organizations, help in the formulation of recommendations to alleviate some of these problems. In response to this request, Mrs. Nellie Vanderlinden and Sister Rebecca were appointed to function in this capacity.

Wisconsin Society

The April 22 meeting of the Wisconsin Society of Hospital Pharmacists was held at St. Mary's Hospital in Madison. A lunch was served to the members and guests by the hospital prior to the meeting.

Dr. Robert M. Becker, an internist and a research scientist, was the speaker for the evening. Dr. Becker has been a prime mover in the acceptance and use of the enzyme penicillinase, and he used this drug as the topic for his presentation.

Penicillinase actually is not a really new drug, having been discovered over twenty years ago. It is produced normally by *Bacillus cereus* and this organism is used in the commercial production of penicillin. There is no more potent enzyme known to man than penicillinase; a single molecule is capable of inactivating 10,000 molecules of penicillin per second. It acts by catalyzing the hydrolysis of the lactam ring in penicillin to produce penicillinoic acid, which has no activity, allergic or antibiotic. Pencillinase is also effective against the newer synthetic penicillins because they contain the essential lactam ring.

The business portion of the meeting was devoted to the reading of announcements from the American Pharmaceutical Association and state and local groups.

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Patient was weak and emaciated before Dianabol. R. C., age 51, weighed 160 pounds following surgery to close a perforated duodenal ulcer. His convalescence was slow and stormy, complicated by pneumonia of both lower lobes. Weak and washed out, he was considered a poor risk for further necessary surgery (cholecystectomy). Because a conventional low-fat diet and multiple-vitamin therapy failed to build up R. C. sufficiently, his physician prescribed Dianabol 5 mg. b.i.d.

Patient regains strength on Dianabol. In just two weeks R. C.'s appetite increased substantially; he had gained 9½ pounds of lean weight. His muscle tone was improved, he felt much stronger. After 4 weeks, he weighed 176 pounds. Biceps measurement increased from 10" to 11½". For the first time since onset of postoperative pneumonia, his chest was clear. Mr. C.'s physician reports: "He tolerated cholecystectomy very well and one week postop felt better than he has in the past 2 years."

Specialized Institute on Hospital Pharmacy

► FOR THE FIRST TIME, a specialized institute on hospital pharmacy will be presented in 1960. Although complete details have not been worked out, preliminary recommendations have been reviewed by the ASHP Executive Committee.

The following general information is being supplied in anticipation of questions. Due to the preliminary nature of the information, the final program is subject to change:

Length—Three days.

Date—October 12-14, 1960.

Location—American Hospital Association Headquarters Building, Chicago, Illinois.

Housing—Lake Tower Motel (four blocks distant).

Proposed Format—Study in depth of one or more subjects:
a) lecture
b) study group
c) seminar (pre-institute readings may be required).

Theme—"Administration" as a central theme with possibly some "professional" subjects.

Program Content—May include: principles of organization and administration, principles of supervision, management planning and scheduling, problem solving techniques, etc.

Requirements—The registrant must be a hospital pharmacist. Further, qualification for attendance at the specialized institute must be determined by each prospective applicant after carefully reviewing the announced program. In arriving at a decision, each individual should consider such factors as, a) attendance at previous general institutes, b) length of experience and previous positions held, and c) current position.

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The following ASHP members sponsored the New Members listed in this issue of the JOURNAL. *The officers of the* SOCIETY *and the Committee on Membership and Organization appreciate the efforts of the individuals who have encouraged New Members to join the national organizations.*

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In Memoriam

SISTER MARY EDWARD,

Pharmacist at St. Vincent Hospital, Worcester Massachusetts, died on Easter Sunday, April 17, 1960. Sister Mary Edward had been a nun in the order of the Sisters of Providence of Holyoke, Massachusetts, for sixty years.

Canadian born on October 1, 1877, Eva Marie Poisson as she was known to her native town of Gentilly in Quebec, emigrated to Holyoke in 1900 to dedicate her life to the service of the poor and sick as a religious in the Congregation of the Sisters of Providence.

Following her religious profession, she became interested in pharmacy work and in 1912 secured her registration in pharmacy in Massachusetts. She labored untiringly in her chosen field for the relief of the sick at St. Vincent Hospital in Worcester, Mass., for the major portion of her religious career. During her last years at this institution she also acted as Assistant to the Superior there. Other assignments in the same sphere of activity included St. Luke's Hospital in Pittsfield, Massachusetts, and the Mercy Hospital, Springfield, Massachusetts.

Naturally active and energetic, Sister always evinced a keen interest in the ever changing trends in the field of medicine with the passing years. She gladly availed herself of every opportunity presented to broaden the scope of her knowledge and perfect her skill in that branch of service.

In addition to holding membership in the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, Sister belonged to the American Pharmaceutical Association and the Massachusetts Society of Hospital Pharmacists. In this latter organization she served as Treasurer for many years and was one of its founding Members.

WILLIAM D. UPCHURCH, SR.,

Chief Pharmacist at Methodist Hospital in Memphis, Tennessee, was killed in an automobile accident on May 12. Mr. Upchurch has been a member of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS and the American Pharmaceutical Association and was active in the Southeastern Society and the Tennessee group. During the past month, he was elected Treasurer of the Tennessee Society of Hospital Pharmacists.

The accident in which Mr. Upchurch was fatally injured occurred when he was driving to a meeting of the Tennessee Hospital Licensing Board which was to be held in Nashville.

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*A. J. Aballi, V. L. Banus, S. de Lamerens and S. Rozengvaig, J. Dis. Child., 97:524, 1959. And abstr. in J.A.M.A., 170:2249, 1959 and Nutrition Rev., 17:229, 1959

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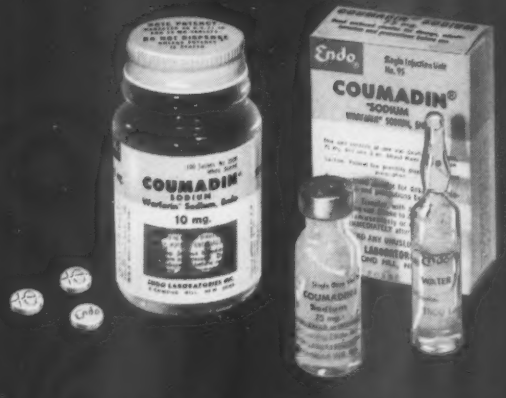

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1. Baer, S., et al.: J.A.M.A. 167:704, June 7, 1958.
2. Moser, K. M.: Disease-a-Month, Chicago, Yr. Bk. Pub., Mar., 1960, p. 13.

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stop staph newsletter

SEVENTH OF A SERIES WITH SIGNIFICANT SUGGESTIONS FOR CONTROLLING CROSS INFECTION

EACH month as the many surgical, medical and hospital journals come to my desk, I'm newly aware of the intensive efforts being made to "stop staph" in hospitals all over the world. Pin-pointing any one source for spread of infection seems to have given way to recognition of the many sources of spread—nasal, contact, and airborne—and the importance of reducing staphylococci in the environment to such an extent that they aren't around in sufficient numbers to cause cross infection.

In the March 26, 1960, issue of The Lancet (London), Dr. W. D. Foster reports on an investigation in a 30-bed ward of St. Thomas' Hospital which revealed that when disinfectant mopping was done daily and furniture wet dusted with disinfectant-soaked cloths, cross infection was practically non-existent—even though full isolation precautions were not observed for the eight staph-infected patients in the ward. Relaxation of aseptic cleaning measures immediately brought a rise in infections.

Much discussion goes on in medical and public health journals and at hospital meetings about the continuing need to be aware of the dangers of tuberculosis. Though deaths have decreased phenomenally, incidence is high, and unsuspected infection is an ever current problem. This question from Dr. Carl W. Walter's O.R. Question Box (Hospital Topics, April, 1960) emphasizes some of the dangers.

"Q. Our anesthetists will not allow airways or endotracheal tubes to be autoclaved. Do you approve if they are adequately cleaned?

A. The tubercle bacillus is the most dangerous potential contaminant of anesthesia equipment....Besides protection of the patient from contamination, another concern is protection of personnel. They must be cautioned to immerse soiled equipment in germicide immediately after use, and postpone cleaning until there has been adequate exposure to the germicide."

A new folder on L&F Instrument Germicide is just off the press and contains interesting data on its effectiveness against TB bacilli—*even when dried on instruments.* This germicide penetrates the organism's capsule and destroys it as well as antibiotic resistant Staphylococci, Pseudomonas, fungi and other potentially infectious organisms. We will be glad to send you this new folder and a generous sample of L&F Instrument Germicide. It's ready to use as is, without mixing or diluting.

In a study of one year's experience with 29 postoperative wound infections in 984 cases on the orthopedic surgical service, Doctors Tracy and Carr (North Carolina Medical Journal, December, 1959) point up the direct relationship between lengthy procedures and the opportunity for infection. Ten infections were deep, three of these resulting in death. Average delay in recovery in deep infection was 34 days and in superficial infections, 8 days. These surgeons say, "...a long open operation provides ample time for airborne contamination, especially when one considers that the contaminating organisms may already have reached a stage of accelerated growth. With a generation time of 20 to 30 minutes, a small inoculation of organisms (staph) into devitalized tissue or clotting blood can progress to an important focus during a case."

Average operative time was one hour and thirty-five minutes with open hip procedures and lumbosacral fusions taking up to four hours. "Among static objects in the operating suite, five out of six grew hemolytic staphylococci. The airborne spread of organisms was demonstrated by an agar plate exposed in the operating room for one hour, which grew abundant colonies of hemolytic staphylococci."

If you were wondering about the disinfectant activity of Tergisyl® detergent-disinfectant against other infectious organisms besides antibiotic resistant staph, please send for our revised brochure on the new formulation. It is planned for even greater economy in buying and saving in labor. With the new 1:100 recommended dilution, dependable bacteriological control and aseptic detergent action are achieved in one cleaning operation. Rinsing is not even needed. If you would like samples of Tergisyl, as well as the brochure, please don't hesitate to ask for them.

L&F's Tergisyl is the detergent-disinfectant being used at Huggins Hospital in Wolfeboro, N.H., and reported upon by Dr. Ralph Adams, Chief of Surgery, in the April 4, 1959, issue of the Journal of the American Medical Association, after successful control of infection in the O.R. in 300 consecutive cases. With the infection rate still at only .25% after 800 cases, Dr. Adams reported his "zone concept" of O.R. infection control in Surgery, Gynecology and Obstetrics 110:376 March, 1960. Amphyl® was used for blanket disinfection. Reprints of both articles are available. May we send them to you?

Is there an area in your hospital where you find disinfection procedures particularly hard to apply? If so, please accept my invitation to discuss it with us. Although disinfection applies to only one part of the complete infection control program, it is an important one and we just might be able to help. Our research laboratories and technical advisors would be glad to work with you and I, personally, hope you will ask. Please let me hear from you.

Charles F. Manz
General Sales Manager
Professional Division

LEHN & FINK PRODUCTS CORPORATION
4934 LEWIS AVENUE, TOLEDO 12, OHIO

Dear Sirs:

Comments on "Pharmacy in Zagreb"

DEAR SIRS:

Your editorial entitled "American Pharmacy in Zagreb" appearing in the May 1960 issue of the AMERICAN JOURNAL OF HOSPITAL PHARMACY was read with much interest.

We noted in particular your implication that "American pharmaceutical leaders" have encouraged and condoned such exhibits "by their acceptance, their silence or their inaction."

We would like you and the readers of your excellent journal to know that the American Pharmaceutical Association has not been among those who have encouraged such exhibits by acceptance, silence or inaction. As early as June 4, 1959, when the news release from the Department of Commerce (dated June 2) was received by A.Ph.A. announcing the Rexall Poznan International Trade Fair exhibit, I asked George Griffenhagen to get in touch with the Commerce people and explain our interest in exhibitions of this kind to be sure that the profession of pharmacy is properly presented, and in the name of the profession, ask that the A.Ph.A. be consulted about such exhibits.

Because of the summer absence of the key personnel in the Office of International Trade Fairs of the Department of Commerce, and the pressure of work associated with the Cincinnati convention. George Griffenhagen was not able to visit with Mr. Harry B. Lyford, Chief of Public Information for the Office of International Trade Fairs, until early in September. During that visit, George learned that Drug Fair of Washington, D. C., had already been "chosen" as a participant at the 1960 Zagreb, Yugoslavia, International Trade Fair.

The visit did some good, however, because since that time the Office of International Trade Fairs has assigned Mr. Peter D. Tasi, Industrial Design Specialist, to create a separate exhibit using Commerce funds to be located in a conspicuous location before entering the Drug Fair exhibit to neutralize or dispell the erroneous impressions that may be created about American pharmacy. In Tasi's own words, the Office of International Trade Fairs now "are concerned about fostering the wrong impression as to the criteria constituting an American 'drug store.' Rather than directly expose the Yugoslavs to Drug Fair, which is essentially a junior department store, we feel it best to lead into this by means of an exhibit depicting the history of American drug stores."

Since February, George Griffenhagen has been working closely with Mr. Tasi and the Office of International Trade Fairs in developing such an exhibit which will not only trace the history of American pharmacy, but will present a view of the many types of pharmacies common in the USA today, including typical representations of hospital pharmacy, exclusive prescription pharmacies, and the small town corner drug store.

Rather than to "blast" the Office of International Trade Fairs with an editorial in the *Journal of the American Pharmaceutical Association, Practical Pharmacy Edition* (which by the way we prepared last October for consideration), we have found that first hand contacts with the persons responsible for these activities are more fruitful. True, Drug Fair will be shown in Zagreb, but not as a typical American pharmacy thanks to the development of the introductory exhibit. What is more important is that we have established direct contact with the Office of International Trade Fairs and are assured that they will consult us in the future when pharmacy is to be exhibted at an international trade fair.

WILLIAM S. APPLE, *Secretary*
American Pharmaceutical Association
2215 Constitution Ave., N.W.
Washington 7, D. C.

DEAR SIRS: Concerning your editorial "American Pharmacy in Zagreb: Amen— as forcefully as your editorial.

WILLIAM M. HELLER, *Director of Pharmacy Service*
University of Arkansas
Medical Center
Little Rock, Arkansas

editorial

by DON E. FRANCKE

The Philosophy of Quality Control

► ONE OF THE BASIC PRINCIPLES OF THE PROFESSION is the responsibility of the pharmacist for the strength, quality, and purity of the drugs he dispenses. This applies to all drugs: those purchased from commercial sources, those extemporaneously compounded as individual prescriptions, and those manufactured in bulk quantities in the hospital pharmacy.

Quality of purchased pharmaceuticals is ensured by selecting reliable sources of supply and in performing analytical and pharmaceutical tests in selected cases. The quality of medicinals prepared in the pharmacy is best assured by adopting and implementing an administrative policy of control which is broad enough to encompass all steps leading to the finished product and one which imbues the pharmacists with their responsibility as members of a profession and fosters pride in the products of their hands.

Too often, the control of pharmaceuticals is looked upon as the testing or assay of the final product. But this is not the complete story. One cannot assay or inspect quality into a product. In fact, it is quite possible for a medicinal preparation to assay at 100 percent potency and still not be therapeutically effective if its pharmaceutical properties are not correct. Rather, control of the product begins with the purchase of raw materials and continues step by step throughout all manufacturing processes and includes all activities which contribute to the quality of the final product.

Thus quality control may be thought of as a system of procedures and checks established in the hospital pharmacy to assure the identity, strength, quality, and purity of the finished product.

The broad scope of a quality control program is well exemplified by the interesting enumeration presented by Vleit.[1] Quality control of drugs encompasses:

Establishing standards and specifications for all purchased materials including drugs, chemicals, containers and finishing supplies;

Setting standards to be met by finished products;

Determining what laboratory testing procedures are to be applied to every product;

Approving all standard methods to be followed in manufacturing each product; and all changes that are made in these methods including the use of new or different equipment;

Establishing procedures for the inspection and sampling of all materials that enter into the finished package including drugs, containers and printed materials;

Developing systems for checking amounts and identities of all materials delivered by the warehouse to the plant and for checking amounts and identities of all materials put into the formula;

Devising procedures to insure that the proper finishing supplies, stamped with the correct batch or control number and with any other pertinent marks such as expiration date, etc., are used in a satisfactory manner;

Providing a system for auditing amounts of finished materials against amounts of all materials used;

Establishing a routine to check regularly the accuracy of all weights, measures and devices used for weighing and measuring and for checking temperatures, humidities and other conditions affecting manufacturing and testing operations;

Operating chemical, biologic, bacteriologic and physical testing laboratories to conduct the tests that must be met by all products including purchased and finished materials to determine whether they meet legal standards and the claims made for them;

Maintaining a file of samples representing all batches approved for sale;

Maintaining records covering all manufacturing, finishing and testing operations;

Checking plant cleanliness and sanitation and the suitability of space and equipment provided for various operations;

Operating a program to insure that every employee assigned to any control function is properly qualified and trained and is doing a good job;

Checking manufactured items at regular intervals to determine the maximum normal shelf life;

Exercising control over stock inventories so that, when necessary, the sale of any unsuitable older lot will be discontinued;

Reviewing all complaints concerning quality of products;

Making regular checks to determine that all functions listed are being conducted properly; and

Finally, the regular reviewing of all of these functions in the light of growing experience and knowledge to determine what improvements need to be made from time to time.

All hospital pharmacies regardless of size can and should have a control program. It may be simple or complex depending upon the needs of the individual hospital. But it is important for the pharmacist in charge to say, "We will have a control program" for this commitment puts into motion the general philosophy of control and leads inevitably to the procurement, production and dispensing of medicines of better quality.

In this issue of the JOURNAL, Dr. Brodie discusses many aspects of quality control in hospital pharmacies. His article may be read with profit by all pharmacists.

[1]Vleit, E. B.: Systems of Control in Drug Manufacture, *Quart. Bull. Assoc. Food and Drug Officials* 13:136 (Oct.) 1949.


QUALITY
CONTROL
IN THE
PHARMACEUTICAL
SERVICE
OF HOSPITALS

by DONALD C. BRODIE

► THE WORD "CONTROL," IN A PHARMACEUTICAL sense, connotes those functions that regulate quality, purity and strength of compounded or manufactured pharmaceuticals. All too frequently the need for rigid control procedures is associated only with large-scale manufacture in the pharmaceutical industry, with but little concern for routine dispensing and operation as found in hospital and general pharmacy practice.

Although the initial responsibility for pharmaceutical control in a hospital rests at the administrative level, implementation of the program resides largely with the pharmacy staff, the real success depending upon the degree of responsibility that each individual pharmacist wishes to assume. In general, the pharmacist performs his duties *individually,* independent of others; he alone selects and weighs ingredients, compounds and dispenses medication; he alone provides the ultimate control. He fulfills the moral and ethical responsibility of the profession to public health and safety. Professional judgment, in the final analysis, is probably the most important single factor in determining the adequacy or inadequacy of a control program.

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Presented at the Institute on Hospital Pharmacy, University of Utah, Salt Lake City, Utah, June 1959.

Since judgment is a subjective matter, it is apparent that agreement among pharmacists can be achieved only in the broad sense and an acceptable common denominator for a control program is possible only in terms of broad objectives. However, an attempt to define an adequate control system might be made as follows:

> Pharmacy service in a hospital should have, as one of its component parts, a system of control through which all incoming drugs and supplies and fabricated preparations resulting therefrom become available to the patient in a condition that assures uniformity of product, and provides purity, accuracy and stability according to acceptable drug standards and in keeping with good professional and scientific judgment.

Objectives of Control Program

What are the objectives for quality control in the pharmacy service of a hospital? This will depend upon the nature and scope of the service, among other things. Since each hospital will have objectives peculiar to its own needs, the author can best illustrate his point by listing for you the objectives for pharmaceutical control at his own institution, the University of California Medical Center. Permit him to add, parenthetically, that at the Center there are inpatient and outpatient dispensaries, a manufacturing unit, a sterile solution laboratory with pyrogen testing facilities, and a culture media unit. At present, approximately 500 hospitals beds are being served. The objectives are as follows:

1. To provide medication that is safe for human use
2. To provide a pharmacy service that conforms to legal requirements
3. To provide physical facilities that lead to an efficient pharmacy service
4. To maintain an adequate reference library and information service
5. To provide an inspection service that will insure proper control of all drugs stored within and without the hospital pharmacy
6. To control the distribution of drug samples
7. To provide adequate inventory of drugs and supplies within fiscal budgetary limitations
8. To insure preparation of medication according to acceptable pharmaceutical and scientific techniques
9. To insure stability of products commensurate with anticipated shelf life
10. To insure identity of ingredients in all medication
11. To insure accuracy and potency of dosage in all medication, and
12. To insure organoleptic uniformity of drugs and preparations of drugs

If you have never taken time to do so, may I urge each of you administrative pharmacists present to set forth objectives for your own control program. After establishing these, check your current procedures to determine if you are fulfilling your intended objectives. Self analysis is often a useful technique in determining the value and completeness of a program, be it one of control or otherwise.

In discussing qualitative control as it applies to hospital pharmacy, three distinct areas appear to justify consideration: Administrative Control, Dispensing Control, and Manufacturing Control. Obviously, there is a degree of overlapping among these three divisions, but each, in its own right, has certain distinct features.

Administrative Control

The success or failure of the control program for pharmacy service rests with the administrative pharmacist. He is responsible for over-all policy and budget. The control system in pharmacy service will be no better than its policy, and the adequacy of the policy in turn will reflect the professional standards and judgment of the administrative pharmacist. Administration must be responsible for a number of features in the total control program, although these may contribute indirectly rather than directly to control procedures

per se. Space, for example, is extremely important in an adequate control program. Adequate space to most of us is a Utopian concept that never becomes a reality. Nevertheless, the adequacy or inadequacy of space influences storage and efficiency of physical organization and operation, each essential for good control. Storage for heat-labile, photosensitive and flammable materials requires special facilities, as do narcotics and alcohol.

The system of records for control purposes is established at the administrative level. Inventory control must be systematized to permit ease of inventory analysis at periodic intervals. Kardex systems are efficient and require minimal space. Records for manufactured items must be carefully designed. When used they should permit ease of recording and provide the complete record, both qualitative and quantitative, on each batch manufactured.

The quality of a pharmaceutical preparation can be no better than that of the poorest ingredient it contains. Hence, one of the essentials in pharmaceutical control is the quality of the raw materials purchased. The administrative pharmacist should be able to design a purchasing policy that will permit him to establish specifications for drugs and to name reliable sources of supply. By the same token he should reserve the prerogative of refusal when items do not conform to specifications or, which in his professional judgment, are not acceptable.

Standard and special equipment are often required, the procurement of which must be initiated at the administrative level. At times special funds are needed and, if possible, anticipation of these needs should be made well in advance.

The importance of stock control both to operation and control cannot be over-emphasized. Good stock control provides an adequate fresh supply of raw materials, the amount depending on the amount used, frequency of use, available storage space and physical properties of the materials.

The administrative pharmacist also participates in the control program indirectly through the Pharmacy and Therapeutics Committee. In this instance, the policy of the Committee is reflected in stock and inventory controls for the hospital pharmacy. In addition, pharmaceutical control is exerted by the judgment of the Committee relative to approving or restricting the use of certain drugs.

Dispensing Control

The staff pharmacist becomes the key person when dispensing controls are discussed. In the dispensing services, he is obligated to follow the stated administrative policy; he is morally responsible for accuracy and honesty, and he is alert to the need for continual self and departmental improvement in order to maintain high standards of control. What are some of the features of good qualitative control at the dispensing case? There are numerous ones, among which are: (1) ability to concentrate on the immediate task; (2) good, careful and critical reading habits; (3) arithmetical accuracy (dispensing control often fails at this point); (4) proper care and use of balances, weights, etc.; (5) consideration for proper graduates in measuring liquids, and other devices, for example, pipettes and hypodermic syringes, when extreme accuracy is required; (6) appreciation of the degree of error in capacity of prescription containers, such as bottles and ointment pots; (7) willingness to use a cooperative system of checking prescriptions and orders with others; (8) personal and dispensing cleanliness; (9) willingness to call a physician rather than to assume responsibility for an order that is not clear; (10) appreciation of good pharmaceutical technique as an essential for adequate personal control; (11) willingness to exert a professional judgment when questionable usage of drugs is proposed; (12) development of a critical organoleptic sense; and (13) use of safe methods of stock control.

In the final analysis, dispensing controls rest almost entirely with the integrity of the individual pharmacist. Carelessness, sloppy work habits, lazy reading habits and poor standards of cleanliness are all deterrents to good individual standards of control.

Non-Critical Attitudes

With your permission, I am going to digress somewhat from my central theme in order to comment on a phase of individual dispensing control that has interested me for a number of years. You and I both agree that control is inherent in pharmacy's obligation to public health and safety, and it is gratifying that the conduct of most pharmacists in this regard is commendable. We do know, however, both from personal observation and from numerous surveys, that there are pharmacists whose dispensing practices are careless and therefore poorly controlled. The same pharmacists give tacit acknowledgment of their professional responsibility for accuracy and professional honesty in the preparation of medicaments; their training has prepared them to develop a sound professional judgment based on scientific fact and experience; they are familiar with national drug standards, as well as the legal and moral responsibilities of pharmacy. Yet, in their day-to-day practice their acts and attitudes are often diametrically opposed to the above. The case of the pharmacy student is also of interest. The student pays diligent attention to the analytical techniques and skills of quantitative chemistry and drug assay, but when he begins to compound and dispense prescriptions, for some strange reason, the quality, purity and strength of his product are often taken for granted. One of the explanations that perhaps accounts for some of the indifference to

control of extemporaneous drug procedures by both students and pharmacists lies in the fact that our American pharmaceutical and chemical industries supply us with pharmaceuticals and chemicals of high quality. Furthermore, they supply us with most of our pharmaceuticals prefabricated, leaving more or less only the routine dispensing function for the pharmacist. This complete reliance on the industry for quality pharmaceuticals has lulled some pharmacists into a sense of false security. Their alertness to pharmaceutical quality and labeling has been dulled by a non-critical professional attitude and they seem to have developed lazy and careless habits in pharmaceutical technology. One wonders if perhaps in other countries pharmacy practice does not demand greater attention to quality control than it does in this country. For example, in Norway the pharmacist, in addition to his dispensing service, manufactures his own official preparations, the control (qualitative and quantitative) of which is his own personal responsibility.[1] Furthermore, he routinely checks, at least in a qualitative way, the chemicals he purchases for his laboratory.

Manufacturing Control

Manufacturing controls are designed to provide a program of control for so-called bulk manufactured preparations. There are several distinguishing characteristics between the dispensing operations referred to above and those encountered in manufacturing operations. *First,* the amounts prepared are small on the one hand and potentially large on the other. *Second,* storage of both raw and finished materials is a continuing problem in the manufacturing operation. *Third,* greater tolerance limits are necessary for extemporaneously compounded preparations.

The pharmaceutical industry has elaborate control programs which provide rigid standards of control for manufactured pharmaceuticals. Such extensive control procedures, obviously, are not indicated in hospital pharmacy practice, but the same principles of control must be established. No two manufacturing services are the same and, by the same token, no two control programs will be the same. Each control system must be designed to fulfill the needs of a particular pharmacy service. Klemme[2] states that a manufacturing control system should have three essential features. *First,* it should provide an effective means of determining product quality; *second,* it should provide the complete history of a product; *third,* the system should be as simple as possible.

Detailed consideration of manufacturing controls is beyond the scope of the program today, but a listing of the essential steps will tend to review for you the salient features of the program. I suggest that you consult Klemme's paper referred to above as it provides, in my estimation, excellent and detailed coverage of this phase of quality control. I commend to you particularly his discussion of budgetary control.

1. Procurement of quality raw materials and establishment of a suitable inventory system.
2. Identification and storage of raw materials.
3. Printing of formula cards to provide the "complete history of the product" referred to above. Working formula cards follow a product from the initial to the final step of manufacture and become permanent records for future reference if needed. Briefly, the formula card contains: date of manufacture, started and completed; name of product and dosage form; ingredients and amounts; procedure for manufacture; signature of pharmacist(s); results of assay; special notations of manufacturing process; yield; control number.
4. Manufacture of the product.
5. Sampling, assay and acceptance or rejection.

One of the most exacting of hospital pharmacy operations which requires meticulous control is the manufacture of sterile solutions. Here, the ultimate objective is a full-potency preparation that is free from both microbial and pyrogenic contamination. In general, the same control features as discussed previously are essential. However, the process of manufacture must be carried on in an environment that is scrupulously clean; equipment must be cleaned with great care; drugs, chemicals and raw materials must be of highest purity; freshly distilled water must be available; special filtration equipment is needed; dry and moist heat sterilization facilities must be available, and facilities for sterility and pyrogen assays must be at hand or available.

Sterile solution manufacture in the hospital pharmacy cannot be undertaken without sound quality control features from the outset. The responsibility and liability are too great and professionally-sound administrative controls are essential. A rather recent discussion of quality control for sterile solution manufacture has been presented by Olynyk.[3]

Standards

A discussion of pharmaceutical control is incomplete without consideration of standards and tolerances. The legal standards for drugs in the United States are found in the *United States Pharmacopeia* and the *National Formulary.* Here are to be found monographs on individual drugs with qualitative and quantitative tests for identification, statements of purity, dosage information, etc. In addition to the above, valuable control data regarding drugs are listed: for example, conditions of storage and suggested containers. The *U.S.P.* and *N.F.* list specifications for light-resistant containers, as well as for medicine droppers. The require-

ments for light-resistant containers state that "the requirement for the use of light-resistant containers does not apply to those products when dispensed by the pharmacist unless so indicated in the individual monograph."[4] The question then arises as to the desirability of standardizing the use of light-resistant containers for use in the pharmacy service of the hospital as a feature of the control program. Archambault[5] thinks affirmatively in this matter with the following comment: ". . . we could do no less than to subscribe to the standards laid down by the *U.S.P.* and *N.F.* for the packaging, storage and preservation of its labile items, standards which guarantee a basically-sound prescription dispensing service, inasmuch as it meets all dispensing needs, prevents duplication of inventory, and remains in the competitive glass prescription container field."

Tolerances

Any discussion of standards is incomplete without mention of tolerances for prescription medication. As a rule of thumb, we might suggest that 5 percent tolerance limits for potent medication and 10 percent limits for less potent medication would be a reasonable control. It is true that many official monographs use these limits, but in many such instances the formula is for one liter or one kilogram of preparation. Extending the same tolerance limits to say 100 grams or ml. of preparation, as might be prepared at the dispensing case, imposes limits that might be achieved only with precision that is next to impossible, practically speaking, to achieve. Thus the tolerances for large-scale manufacture must be lessened in order for them to be reasonable control limits for extemporaneous small-scale compounding. The nature of the drug also has an influence on the tolerances that can be attained. Crystalline phenol, for example, is deliquescent and in time absorbs moisture from the atmosphere. Furthermore, it is photo- and air-sensitive. Thus Liquefied Phenol, U.S.P. and lipid or glycerin solutions of phenol may very well be considerably below intended strength. Reasonable control for phenol preparations must be sufficiently broad so as to account for its physical properties. Another related example is that of Ephedrine, N.F. The official maximal moisture content of the alkaloid is not more than one-half a molecule of water. Continued opening of a container gradually increases the water content of the alkaloid. In time, lipid solutions of the base will not be clear, but will be cloudy because of the increased water content, and may be below intended strength.

Goldstein[6,7] has devoted much time to the study of reasonable tolerances for medication compounded and dispensed at the prescription case. He devised a system that provided "selective" sampling which served as the basis for the determination of standards of tolerance in extemporaneous pharmaceutical compounding. As a result of these studies, he concluded that 1.73 x the standard deviation was a "reasonable and equitable tolerance" for liquids and ointments. Expressed in percentage of the "weight of ingredient requested," Goldstein assigned tolerances of 7.5 percent to 17.5 percent, respectively, for compounded solutions (weight requested 17.5 grams-0.3 grams), and 10 percent to 17.5 percent, respectively, for compounded ointments (weight requested 3.11 grams - 0.78 grams). Although this approach to adequate dispensing control may seem too "academic" to be "practical," it provides a reasonable basis for individual standards and I urge you to study Goldstein's works as a guide for the establishment of reasonable tolerance limits for compounded medication.

In summarizing our brief discussion regarding tolerances and standards, it must be recognized that an arbitrary selection of either will not provide reasonable controls. Reasonable tolerances must be based on large- and small-scale manufacturing considerations, on the physical properties of drugs, the intended shelf life of medication, and on the accuracy of the measuring devices used. It is important that reasonable control for tolerances be established, but these can be determined only with careful study and good professional judgment.

Pharmaceutical control is the keystone of pharmaceutical service in the hospital and the service is no better than its control. Good control does not just happen; it exists because it is a planned and built-in component, and it is an integral and on-going part of the service. Hospital pharmacists must be mindful that their full measure of responsibility to patient care and welfare cannot be fulfilled without rigorous control of their service. To achieve the required degree of professional discipline, coordination of effort of all pharmacists, working at both administrative and staff levels, must be obtained.

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OUTPATIENT DISPENSING

from the hospital pharmacist's standpoint

by VERNON O. TRYGSTAD

► PHARMACISTS' VIEWPOINTS DIFFER ON MANY THINGS, depending on their areas of interest. This is natural and to be expected in a profession as diversified as pharmacy. It should not be surprising at all that personal interests will vary (and occasionally conflict) in a profession concerned with activities ranging from the large-scale industrial manufacturing of pharmaceuticals and their wholesale distribution, to the dispensing level where drugs reach the ultimate consumer.

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The retail level also is diversified: it includes the traditional neighborhood and "main street" pharmacies, the newer shopping center and "super" drugstores, the so-called "professional" pharmacies usually located in or near medical centers and of course, the hospital pharmacy. The question now before us is, what kind of patients should be offered the services of the hospital pharmacy? Only bed patients? Patients who have been hospitalized and are going home?

Patients who were not bed patients at all, but came to the hospital for treatment? How about patients who may come to the hospital building because their doctor has his office there and uses the diagnostic and treatment facilities of the hospital? And how about

the private patients of physicians who are not located at the hospitals?

All pharmacists are not going to agree on the answers to these questions. I am not sure that all hospital pharmacists will agree completely. Their answers—their viewpoints—may depend a great deal upon the situation in which they are employed. I will not attempt to express the views of all hospital pharmacists. I will try to discuss the question, however, from the officially stated position of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. This is on record. I will also express some personal views.

ASHP Policy

The official Guide to Application of the Minimum Standard for Pharmacies in Hospitals—adopted by the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, and by the Division of Hospital Pharmacy of the American Pharmaceutical Association—has this to say: "Only those orders and prescriptions originating within the hospital should be filled by the hospital pharmacy. Prescriptions written by physicians who are not members of the hospital staff should not be filled by the hospital pharmacy." The SOCIETY reaffirmed this policy in definitive resolutions passed in 1953 and 1954.

Leading up to this in 1952, the American Pharmaceutical Association passed a resolution opposing the filling of prescriptions for private ambulatory patients by pharmacies of tax-free institutions.

Opposition

Although the policy of organized hospital pharmacy was clearly stated in the Minimum Standards prior to the 1952 A.Ph.A. resolution, the ASHP took official notice of the A.Ph.A. action and passed its resolutions of 1953 and 1954. The 1954 resolution, which reaffirmed the long established official position of hospital pharmacy, was adopted by the ASHP after thoughtful and careful deliberation by the Policy Committee of the Division of Hospital Pharmacy, and was based on the Policy Committee's recommendation. During the discussion leading up to this action, it was recognized that there may be situations at local and state levels which would require individual interpretation.

It would be extremely difficult, if not impossible, to establish an over-all policy for application in all of the nation's hospitals. But, in general, it was agreed that solicitation of prescriptions which do not originate in the hospital should be opposed.

Certainly, this question is not new. It has been discussed, debated, and deliberated over for at least the past ten years. I do not know if we are approaching a solution. I hope these discussions on all sides of the question will serve to promote better understanding within the profession of pharmacy.

No resolution, no matter how firmly stated or directed, can accomplish all things. Just this year another resolution was introduced and passed at the A.Ph.A. convention, opposing as unfair competition to community pharmacists the dispensing of prescriptions to "nonconnected" and private ambulatory outpatients by hospital pharmacies of tax-free, nonprofit institutions.

The resolution, as originally introduced, has received considerable publicity, although the final wording has not yet been drafted by the A.Ph.A. This resolution was to be brought to the attention of the American College of Hospital Administrators. This most recent resolution is not much different from those previously passed, nor from the official policy of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. But it may be significant that it is directed to the attention of hospital administrators, apparently recognizing that the total problem cannot be resolved by pharmacy alone, but concerns basic hospital policy.

It may well be a question of relations between hospitals and retail pharmacies, and of the hospitals' status under the licensing and tax laws of the state. Hospital pharmacists in most cases are employees of the institutions, not controlled by the hospital as to professional conduct, but subject to the hospital's administrative policies. True, hospital pharmacists, as department heads, often may influence the hospitals' policies, but they usually cannot dictate or direct them. Another resolution was adopted at the NARD convention and was directed to the AHA and the ASHP. This resolution asked hospital pharmacies to stop supplying prescriptions to outpatients. It also expressed disapproval of a pharmacist's being associated with hospital outpatient pharmacies. This is the first time, to my knowledge, that one branch of our profession has attempted to approve or disapprove the setting in which another should practice.

These are changing times. Even though general policies adopted in the past by our national organizations may still be valid and in effect, it may be well to take a look at our present-day situation and see if we still have the same conditions on which the original policies were based.

First, what kind of hospitals are we discussing? Where is all the furor originating? Let us eliminate, for purposes of this discussion, the government hospital. In general, patients of a government-owned hospital are the responsibility of the agency operating it, for total medical care and treatment for both inpatients and outpatients.

This hospital usually has its own salaried medical staff and complete facilities, including a pharmacy. The governmental agency may contract on a fee-basis for some services to supplement its own, such as physician, pharmacy, ambulance services, and home nursing care. But essentially, the patient is under the care of the governmental institution and is not considered a private patient.

Let us also eliminate from our discussion the private, profit-making clinic or hospital which is operated as a business and taxed accordingly. The pharmacy might be owned by the hospital or operated as a "business" by an individual pharmacist. Dr. Letourneau[1] says there is no "general ethical prohibition" against hospitals owning drugstores. This view was based in part on the removal, from the American Medical Association's Code of Medical Principles, of any mention of physician ownership of pharmacies. Dr. Letourneau also states that no hospital association has declared it unethical for a hospital to own a drugstore.

I am sure there would be other views on this in some pharmacy circles. Going back to 1951, the American Pharmaceutical Association adopted a resolution at its annual convention opposing the establishment of retail pharmacies in hospitals as "grossly unfair to pharmacy and pharmacists." The resolution further stated that this (retail pharmacies in hospital) is certain to result in resentment on the part of pharmacists. This problem, and the predicted resentment, may have increased during the ensuing years. But today, we are not discussing, primarily, the proprietor-type retail pharmacy located in a hospital; but rather, the hospital pharmacy having the same nonprofit status as other departments in the hospital.

We are discussing, then, only the pharmacies in nongovernment, nonprofit, tax-exempt hospitals. We are concerned, of course, with the objection by some of our colleagues to hospital pharmacies dispensing prescriptions to outpatients who otherwise might patronize the retail pharmacy. The question basically, then, is the tax status of the hospital and the pharmacy it operates.

With emphasis on the *tax-exempt* institution, and with taxes as an important part of the retailer's overhead, it can be assumed that the principal objections are: (1) the hospital pharmacy can price prescriptions lower because it doesn't pay taxes; and (2) if it prices prescriptions the same as the retailer, it can make more profit.

There are, of course, different types of outpatients, some of them only remotely potential customers of the community pharmacy. Defining an outpatient as a person who makes use of the diagnostic or therapeutic services of a hospital but does not occupy a regular bed or bassinet, MacEachern[2] classified outpatients in this way:

A clinic patient is one who is unable to pay a private physician and who, for a nominal charge or no charge at all, receives the diagnostic or therapeutic services of the hospital.

A private outpatient is one who makes use of the diagnostic or therapeutic facilities of the hospital, usually upon referral of his own physician, and who is charged the established rate for such services. There are two types of private outpatients:

1. A private *referred* outpatient is an outpatient who makes use only of the special service facilities of the hospital—x-ray, laboratory, etc.—upon the referral of his own physician.

2. A private *clinic* outpatient is an outpatient who makes use of the diagnostic or therapeutic services of the hospital, generally in an organized department known as a private-pay clinic.

An emergency patient is one who is received in the department caring for emergencies and accidents, and who is suffering from a condition requiring immediate medical or surgical care.

Out of MacEachern's classification, for purposes of this discussion, I assume we can exclude the nonpaying patient and the patient who can pay only a small token amount—patients who must obtain drugs and other services from a hospital, or very likely go without. This would not be business taken away from the community pharmacy—except, of course, where a welfare or relief agency would be required to pay for it. And I have confidence enough in the profession of pharmacy to believe that it is not seeking to build its business or its profits on relief or charity cases.

Free Choice for Patient

We are discussing essentially, then, the private, paying patient who has a prescription and the money to pay for it, and who can make his own free choice of a pharmacy. Whereas the nonpaying patient *must* use

the hospital pharmacy, private paying patients often find it convenient or preferable to do so. Now we are in the area of controversy. This is the patient—the prescription customer—that some feel should not be offered the services of the hospital pharmacy.

Pharmacy's Contribution to Society

The hospital pharmacy is a department of the hospital, integrated into a total medical care facility. Others include laboratory, x-ray, and physical therapy, supporting the medical and nursing care services of the institution. Here are all the health care services needed by the patient in one location. Of course, a pharmacy in this setting is strong competition for other pharmacies located away from the hospital. Any preferred location gives a competitive advantage to the one who has it and this would be so regardless of the tax status of the institution or business.

The crux of the matter, then, is the tax status of the institution and the possibility that the hospital pharmacy might charge a destructively reduced price, below the retail pharmacy, because of its tax savings. This would be "tough" competition indeed, and I believe most hospital pharmacists would agree. In all fairness, prescriptions accepted from those outpatients who are able to pay should be priced in line with prevailing prescription prices in the community. If there is a profit on "full price" prescriptions, it may help to level off the cost to the hospital for those who are unable to pay.

As Don Francke observed in an editorial,[3] "Free service cannot be provided unless part of the cost of this service is furnished by paying patients as well as by community funds." "Free" prescriptions also might be considered unfair competition. But Joe Vance,[4] writing in *Southern Hospitals,* makes this point: most professions are called upon for a certain amount of free or charity work. Lawyers frequently are assigned by the courts to represent clients who cannot pay. What, then, of pharmacy's contribution?

We would not expect the private pharmacy to furnish drugs without charge to charity patients. But could not, as Mr. Vance suggests, pharmacy's contribution be the foregoing of the potential profit on prescriptions for medically indigent patients whom the hospital pharmacy helps without charge?

Pharmacies Serving Physicians' Private Offices

We have mentioned a number of types of hospitals in which outpatient prescriptions may originate—confining our discussion essentially to the nonprofit, tax-exempt hospital. We also have mentioned a number of types of patients for whom prescriptions are written. Now there is another development taking place in many cities and communities. You might call it a trend. That is the increasing number of physicians who are renting private office space in hospitals.

Reporting on this trend the Rorem study[5] predicts that more private physicians' offices will be established at nonprofit community hospitals in the future. There are a number of economic and administrative advantages to the physician and the hospital. One of the basic motivations, Dr. Rorem reports, is greater efficiency and convenience in medical practice.

Among advantages claimed by physicians are: reduction of travel time between office and hospital; care of inpatient emergencies with only slight interruption of office practice; ease in visiting patients; and ready availability of diagnostic and treatment facilities. With the location of more and more physicians' offices in hospitals, it is to be expected that the full utilization of the hospitals' facilities for ambulatory patients will include pharmacy services.

In most cases, private patients are charged the same rate for prescriptions as in a retail community pharmacy. This, of course, is competition for the community pharmacy. Not unfair price competition necessarily, but competition because of the location of the hospital pharmacy within the complete medical center setting. This competition would be the same whether it were a hospital-operated pharmacy or a privately owned pharmacy operated as a tax-paying business in space rented from the hospital.

If a significant part of the hospital pharmacy's prescription volume, resulting from this trend, now comes from the private patients of physicians who are tenants of the hospital, a question might be raised as to the tax status of the pharmacy, or that part of its business originating with patients who are not patients of the hospital. This, however, is a legal matter between the hospital and the tax authorities of the state or community.

No Moral or Ethical Issue Involved

I see no moral or ethical issue involved in a pharmacist's practicing his profession in the hospital setting, regardless of the origin of the prescriptions he fills, so long as they are correctly filled and legal. On the other hand I would see no logical or valid justification for a hospital pharmacy's policy of soliciting prescriptions from patients who are not being treated by the hospital or by physicians connected with it. If the pharmacy does endeavor to fill prescriptions for the general public, it would seem reasonable that the pharmacy should be established as a business and regarded as such from tax and other legal standpoints.

Advantages for Retail Pharmacies

I am not convinced that members of our profession must resort to claims that the competition is not playing fair.

Surely there are many prescription customers who will recognize the advantages of neighborhood or community pharmacy services. But why not use these competitive advantages to the fullest extent rather than asserting that the hospital pharmacy outpatient department is morally wrong and its competition is "unfair." The pharmacist whose customers are reminded of the inescapable advantages to many patients of having prescriptions of their private physicians filled in the traditional neighborhood pharmacy has little to fear from hospital pharmacy "competition."

Of importance even greater than the economic issue in considering hospital pharmacy services should be the adequacy of the hospital pharmacy staff. Regardless of the setting, whether a neighborhood drugstore, a clinic, or a hospital, physicians' prescriptions should be filled by pharmacists and pharmacists only. In the case of training pharmacy interns, which I view as one of our professional obligations and responsibilities, prescriptions should be filled under the close and immediate supervision of registered pharmacists. I have not come across this situation personally, but I have heard that there may be hospitals in which drugs are dispensed to outpatients from the hospital drug room without the services of a registered pharmacist. If this is so, it is wrong, unsafe, unjustified; and, in most cases, illegal. I do not know to what extent this is taking place, but there is a significant number of hospitals operating pharmacies or drug rooms without registered pharmacists.

Role of Boards of Pharmacy

As I see it, every pharmacy or pharmacy activity should come under the jurisdiction of the State Board of Pharmacy or comparable licensing authority, and should be subject to the same rules, regulations, and controls. This would, of course, require a registered pharmacist in every activity in which prescriptions are dispensed.

Technically, a physician can possess legend drugs and order their administration by a nurse. This may cover some inpatient situations without involving a pharmacist necessarily, but such cases should be rare. I see no justification for dispensing prescriptions to outpatients, except by, or under the immediate supervision of, a registered pharmacist.

I believe that the boards of pharmacy or equivalent licensing and regulatory authorities should have jurisdiction over the practice of pharmacy in every setting—and this includes hospitals.

Whether or not a hospital pharmacy accepts prescriptions from outpatients who come to the hospital for other services may depend to a large degree upon local circumstances. The management of a hospital and its board of directors might want to consider whether or not outpatient prescription activities would jeopardize the existence of community pharmacies needed for their services to the community. Conversely, if the very existence of a hospital needed by the community depended on all the revenue it could produce, including that from the pharmacy department, this might well determine its policies by sheer necessity, which might be in the best interests of the community.

To summarize, it is not possible to state the viewpoint of every hospital pharmacist. This may depend largely upon the policies of the hospital in which he works, and conditions within the community affecting the hospital's policies.

Hospital pharmacists generally would consider it appropriate and within their right and responsibility to fill prescriptions originating with the medical staff of the hospital.

Prices charged to private-paying patients for outpatient prescriptions should be comparable to prevailing rates in the community.

Normally, hospital pharmacies in nonprofit institutions would have no justification for soliciting or accepting prescriptions from the general public or from patients whose treatment does not originate in the hospital.

Pharmacists practice in many settings. Most pharmacies in which they practice yield a profit to the individual operating them. This has been referred to as free enterprise. Others, such as the voluntary hospital, are nonprofit, and give other benefits to the community. The pharmacist, practicing his profession in the hospital setting, and adhering to the rules, regulations, and traditions of his profession in accordance with the policies of his institution, should be free to do so without fear of criticism on moral or ethical grounds from his colleagues in other types of practice. This, too, is free enterprise.

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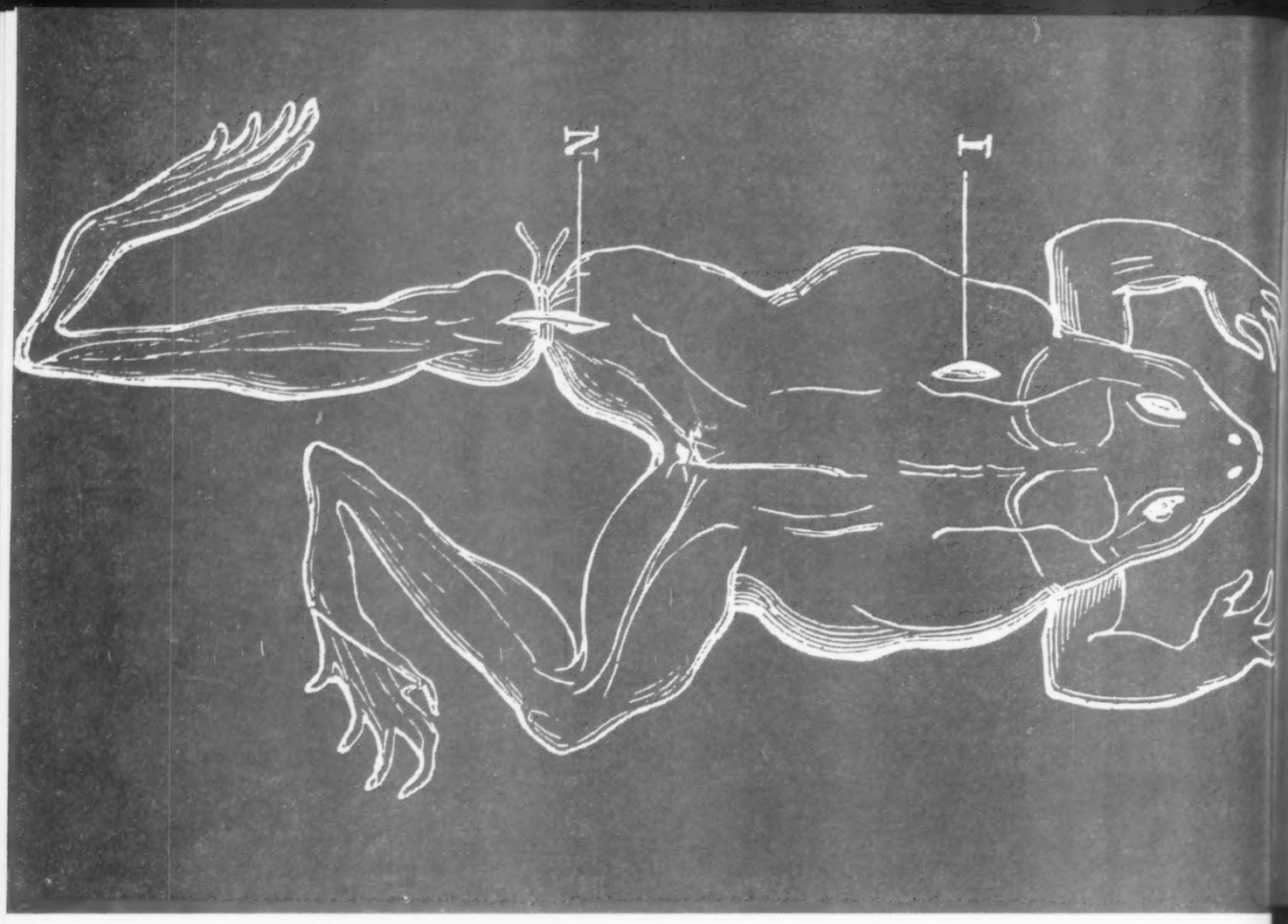

Frog prepared for experimentation—showing incision for introduction of curare, and the sciatic nerve isolated

FROM LA SCIENCE EXPERIMENTALE BY CLAUDE BERNARD, J. B. BAILLIERE AND SONS, PARIS, 1885.

RESEARCH IN PHARMACOLOGY

by GUILLAUME VALETTE

► THE PROBLEM OF RESEARCH IN PHARMACOLOGY can be looked at in many different ways. In whatever scientific field one takes, the question of research can be considered in relation to its needs, its methods, its different orientations; and the subject can be discussed with regard to education, intellectual culture, or a country's economy.

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But I had to make a choice and I thought that the best would be to trace the most remarkable discoveries in the study of drugs on living organisms. These examples will permit me to draw some conclusions on the elaboration of a pharmacological discovery, under its psychological and technical aspects; then I will try to make a synthesis of these conclusions, considering the aspirations of those who intend to enter this field of scientific investigations; and I will conclude with some suggestions on the improvements I consider necessary in our present research system.

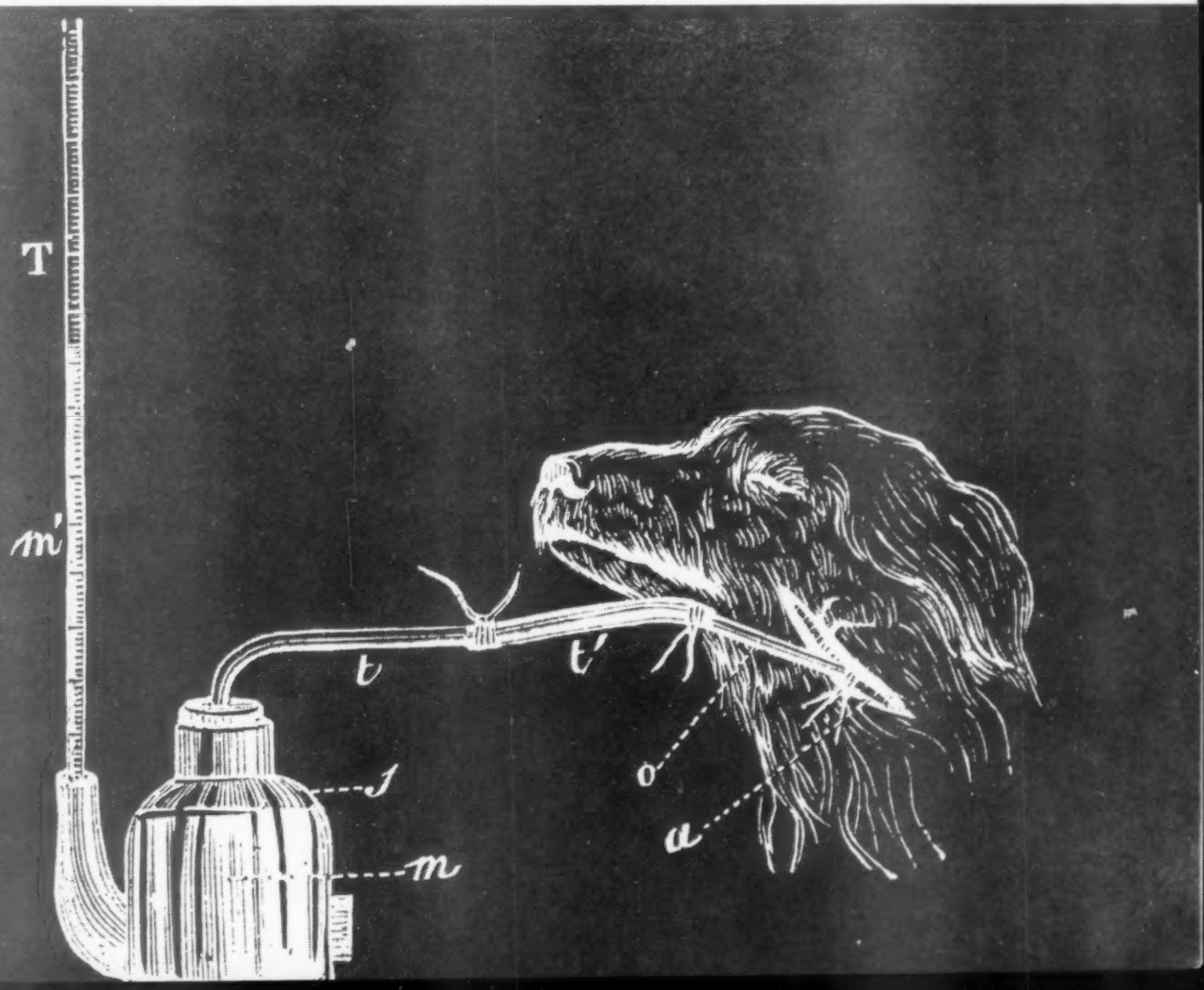
The Chaos That Was Therapeutics

If we look at the history of medicine, we can say, without any disrespect to the ancient scientists, that in spite of the coming of logic and the deductive method in science, in spite of Bacon and Descartes, empiricism prevailed in therapeutics until the end of the 18th century; for dogmatism and doctrinal disputes almost always gained over the critical examination of experimental ideas.

In the chaos that was therapeutics then, Hermann Boerhaave, Professor at Leyde (1668-1738), attempted to make a classification based on mechanistic conceptions; but today it appears to us a little too simple to classify a drug as clearing, melting, distraining, diluting, incising, cleansing, removing stickiness, etc.

These were only witty descriptions arising from a lively imagination, but soon a rational language was to be heard. Lavoisier (1743-1794) proved the importance and the necessity of experimental data in scientific matters. Lavoisier, as we know, was a physiologist as well as chemist, and he also became interested in therapeutics. "When most people see in the cure of a sickness the proved efficacy of a drug," wrote Lavoisier, "a wise man will consider it, more or less, as a probability; and this probability can become a certainty only after a great number of similar cures." Of course, at that time the knowledge of the action of a drug was only based on observations of the patient's behavior and on his answers to questions. Except for spectacular results, easy to note, as in the case of purgatives, diuretics, sudorifics or expectorants, the value of a drug was established only by a modification in the evolution of sickness. Now this is only a conjectural criterion, because no physician can assert absolutely that the amelioration of a patient's condition is due to a drug, as long as a control test has not been made; and still, only repeated verifications of similar results in similar circumstances can allow a doctor to make valid judgments. This

Dog curarized by ingestion—the horizontal branch of a manometer is inserted into the cartoid artery
FROM LA SCIENCE EXPERIMENTALE BY CLAUDE BERNARD. NOUVELLE EDITION, LIBRAIRIE J. B. BAILLIERE AND SONS, PARIS, 1865.



Claude Bernard
FROM CLAUDE BERNARD BY MICHAEL FOSTER, PUBLISHED BY F. FISHER UNWIN, LONDON, 1899.

is what Lavoisier had clearly seen, and this is what unfortunately complicates any valuable conclusions in matters of therapeutics.

Beginning of Experimental Pharmacology

In 1809, Magendie, then 25 years old, dedicated his first work to the study of the effect of poisons from *Strychnos* and *Moraceae* on animals. These poisons had been brought back by the French scientific expeditions into Java and Borneo. He described the symptomatology of the toxic states, and presented his paper at the "Académie des Sciences" in 1809, along with Delille. We can say that this paper, 150 years ago, marked the beginning of experimental pharmacology. A few years later, Magendie, together with Pelletier, carried out a study of the physiological action of ipecacuanha and emetine.

However, in most of his researches, Magendie had only considered the total action of chemical substances on the animal organism, and it was to the great merit of Claude Bernard (1813-1877), his successor in the chair of medicine at the "College of France," that he attacked the problem by what he called "experimental analysis," trying to locate the point of action of a drug or poison, and to go further into the mechanism of its action.

Bernard saw drugs as foreign bodies that we allow to penetrate into the organism with the intention of getting particular results. In fact, all drugs are poisons, differing from these only by the diminished intensity of their action.

But how to explain the action of drugs in the organism? For a long time men thought that the substance penetrated the organs to attack directly the disease-producing element itself and to neutralize it; mercury was attacking the syphilitic virus; acids, the scorbutic virus; alkalies, the rheumatic inflammation, etc. All these assertions rest on hypotheses, some of which appear untenable to the author; what is, in fact, the scorbutic virus and the rheumatic inflammation? Besides, Claude Bernard does not confine himself to conceptions so simple, and so contradictory to current physiological ideas.

Some scientists of that time had tried to give a mechanical, physical or chemical explanation of the action of drugs. Bernard gives a minutely detailed account of the work of Poiseuille, according to which certain diuretics, such as ammonium chlorohydrate, potassium nitrate and iodide, behave as such because, when dissolved in water, they facilitate the flow of water in the capillary tubes. These substances would speed up the renal circulation, as they speed up the flow of water in a test tube.

Bernard also described some attempts to explain the action of purgatives as an endosmotic phenomenon; this explanation can be applied, at least in the first analysis, to the saline purgatives, but is of no value with substances such as croton oil or jalap, which act differently from sodium sulfate.

Bernard expressed himself very reservedly on all this, and considered that these ingenious explanations left one in the dark as to the real causes of the phenomena, only describing the action of particular cases. He was convinced, however, that the pharmacological properties of a drug are no mystery, but are due to chemical phenomena: "There is, in reality, no such thing as strychnine, morphine or curare action; there are only physiological phenomena affected by the physio-chemical action of these substances; the only important thing is to understand these physiological actions."

Unlike many of his contemporaries, Claude Bernard did not overestimate the power of science and he liked to note that man will always find it impossible to answer the question in "Le Malade Imaginaire"—*Quare opium facit dormire?*" A scientific question should never be put in such terms, just as we could not answer why heavy bodies gravitate toward the center of the earth (leaving sputniks aside for the moment). "The intimate nature of things is beyond the frontiers of our knowledge, but we must still seek to understand the underlying cause of phenomena and thus imagine that we know how they happen."

And, in fact, the experimental analysis Bernard practiced so successfully during all his work made him realize that many medicinal effects are only the repercussion of an initial action on a single type of tissue.

The poisonous substance circulating freely in the blood, seizes on its favorite tissue wherever it finds it and, if one single histologic element is modified, this is sufficient to deprive all the other tissues of an essential element. "Generally speaking, the action of drugs on organic elements is selective and can only become general by means of the vascular or the nervous system."

Of all the researches Claude Bernard did on the action of drugs and poisons, those relative to curare are most often referred to because they are a model of experimental analysis. First, Bernard had to sweep away all preconceptions, all legends and inaccuracies. According to ancient authors, curare had the property to clot blood or to stop its coagulation or even to poison plants and young trees. Claude Bernard refutes all these allegations and confirms the fact that curare is not toxic if it is given by mouth. He verifies that this lack of action is not due to an alteration of curare by the gastric juice, but to the barrier of the gastrointestinal mucous membrane; he notes, however, that the poison can be absorbed by the rectum and even by the digestive tract, if given in a strong dose to a fasting animal. He notes that in curare poisoning, the animals ". . . show no agitation, no signs of pain. They are seized by a creeping paralysis which successively reaches all the vital functions."

But this is only the result of an initial effect. Bernard wanted to find the precise point of action and to analyze its nature. According to him, the poison, once in the animal, must pass through three stages: first, it is dissolved in the wound by the body's liquids; then it penetrates the veins and is carried to the heart; from there the poison is finally carried, through the arterial system, to the organs sensitive to its action. Even then, for this action to occur, the substance must be absorbed from the blood faster than it is eliminated in the urine.

Claude Bernard then noted that curare has no action on the respiratory capacity of the blood and no action on the heart: a "curarized" dog can be kept alive if it is given artificial respiration long enough. But the most interesting question to clear up was the action of curare on the nervous system, and the very simple experiment which Claude Bernard devised to test this, is well known. A frog is ligatured tightly at the level of the lumbar region, leaving free the nerve roots connecting with the back legs. A subcutaneous injection of curare is given in the back and the part above the ligature is rapidly paralyzed; movement ceases but sensitivity remains because stimulation of the paralyzed part produces strong reflex movements in the lower back, the part protected from the poison. Thus we see that curare destroys movement without affecting sensitivity. Bernard "dissected, so to speak, the motor nervous system and separated the blood from the muscular system, the sensitive nervous system and the other tissues." On the other hand, if strychnine (a toxic convulsant) is injected into a frog similarly ligatured, convulsions will occur both in the back legs and the front part of the body where the poison was injected. Today we say that curare is a drug with a peripheral action, and strychnine a drug with central action.

Nevertheless, Bernard's curiosity was not satisfied with the results of these experiments. "Not only should we isolate chemically the active principle curare from the foreign matters with which it is mixed," he said, "but we should also determine by what kind of physical or chemical modification the poison paralyzes the organism." Then 80 years passed and in 1864 Wintersteiner and Dutcher isolated tubocurarine and partly explained the mechanism of its effect on the motor end plate (McIntyre).

Thus was fulfilled the wish expressed by Claude Bernard in "Introduction à la médicine expérimentale" . . . "Therapeutics can only be built upon the experimental study of poisons and drugs. When we know how a substance acts on such and such a cell then we will be able to infer a therapeutic action. But if we ignore the mechanism of the modifications we will never be able to formulate a rational treatment; then empiricism would prevail, and this is what the physiologist wants to avoid."

Chemical Composition and Physiological Activity

The work of Ehrlich between 1885 and 1910 was undertaken with the definite objective of estimating the value of anti-infectious organic substances in animals, substances which the German chemical industry was already manufacturing. This was a good plan and valuable for serial assays, once the technique of rigorous investigation was perfected.

In this new field of pharmacology, known since then as chemotherapy, Ehrlich realized the advantages, in rational investigation of new chemical compounds with antiparasite properties, of carrying out tests on animals previously infected with the causal agent of the disease to be studied; the work was done mainly on spirillosis, trypanosomiosis and syphilis.

In all his research, Ehrlich worked from the principle that a drug can only act on tissue capable of assimilating it: *Corpora non agunt nisi fixata,* and this idea brought him to study the manner in which a drug penetrates the cell, to express the theory of chemoreceptors, and to put in opposition the two affinities a therapeutic substance has, on the one hand for the parasite, and on the other hand for the parasite's carrier. From this we see that a chemotherapeutic agent has greater value as it is more parasitotropic and less organotropic; this conception has been put in concrete form by the theory of the chemo-

François Magendie—unsigned early portrait in oil, attributed to Guérin (1774 to 1833) in College of France, Paris
FROM FRANCOIS MAGENDIE, PIONEER IN EXPERIMENTAL PHYSIOLOGY AND SCIENTIFIC MEDICINE IN XIX CENTURY FRANCE BY J. M. D. OLMSTED. PUBLISHED BY SCHUMAN'S, NEW YORK, 1944.

therapeutic coefficient ratio of the curative dose to the toxic dose for a determined animal species.

Ehrlich is probably best known for his work on organic arsenical compounds with antisyphilitic properties. His was the first systematic study of the relation between chemical composition and physiological activity.

After the discovery of atoxyl in 1863 by the French chemist Béchampe and its recommendation as a trypanocide by the English doctor A. W. Thomas (1905), Ehrlich stated that this compound, active against sleeping sickness, was nevertheless, inactive *in vitro* on cultures of trypanosomes. He deduced that atoxyl did not act directly on the parasite, but secondarily to a transformation in the organism, in fact, a phenomenon of reduction. Ehrlich effected the reduction of atoxyl *in vitro* and thus finally synthetized a trivalent arsenic compound, resulting from the coupling of two atoxyl molecules, which was active *in vitro* as well as *in vivo*.

This principle established, he carried out systematic tests with the derivatives of this compound on animals, such as rabbit with scrotum syphilis or a syphilitic keratitis. It was a long and exacting labor. Finally, the 606th derivative, tested by Ehrlich and Hata, under the name of Salvarsan, proved to be active enough and sufficiently nontoxic to be clinically tested. Here I would like to bring to your attention what Ehrlich said with regard to this clinical experimentation: "I had decided to treat many thousands of patients before permitting a general use of my preparation. Because the most minute experiments proving the non-toxicity of a substance in animals and its favorable medicamental properties are still not sufficient for us to foresee the results of its utilization in man."

If Ehrlich obtained the results he did, it was due to this scrupulous perseverance and his unquestionable scientific strictness. "Fishermen who want to catch fish in a big river," said Ehrlich, "will only succeed by blocking it thoroughly with nets that will leave not the smallest gap."

Chemical Transmission of Nerve Impulses

Another series of investigations worth reporting is that started by Loewi, in 1921, on the problem of the chemical transmission of nerve impulses. As we shall see, this question had been in the air since the beginning of the century. Even though it is more related to physiology, its effects in the realm of the pharmacology of the nervous system, and consequently in the whole science of pharmacology, are important enough to merit our consideration. The reader will remember the experiments carried out by the pharmacologist de Gratz: a frog's heart isolated from the organism with its vagus nerves is connected to a glass cannula, from which, at each beat, the heart draws and then gives back a little quantity of Ringer's saline solution. The nerves are arranged in such a way as to receive electrical stimulations. From time to time a sampling of liquid is taken from the cannula and applied to another isolated heart cannulated in the same conditions but beating normally. Now, when we apply to heart B (reactive) the liquid taken from heart A (donor) in absence of any vagus excitation, there is no modification in the activity of heart B; whereas the liquid sampled during a period of stimulation of heart A provokes, at least in many cases, a slowing down and a decrease in amplitude of the beats of heart B. The modifications are closely related to those produced on heart A by nervous stimulation.

We can conclude from this experiment that stimulation of the cardiac vagus nerve is followed by emission of an action or "vagal" substance; it is the freeing of this substance in contact with contractible tissue which is the cause of the phenomenon observed. The cardio-inhibitor nerve, therefore, acts on the heart only by means of a mediating substance. Several years later Witanowski identified this vagal substance as acetylcholine.

This discovery was the beginning of a series of work done mostly by the English School (Dale, Feldberg, Brown, etc.) who, between 1925 and 1939, proved the mediator action of acetylcholine not only

at the parasympathetic fibers end of the autonomic nervous system but also at the synaptic ganglia, and at the junction of the motor fibers and the striated muscles. At the same time, through the work of Cannon, Bacq and Von Euler, another mediator was identified in the sympathetic fibers area, as epinephrine and its demethylation derivative, norepinephrine. But we should recall that in 1904 Elliott in England, impressed by the similarity between the effects of epinephrine and those of stimulation of sympathetic fibers, had already foreseen the mediator function of this amine.

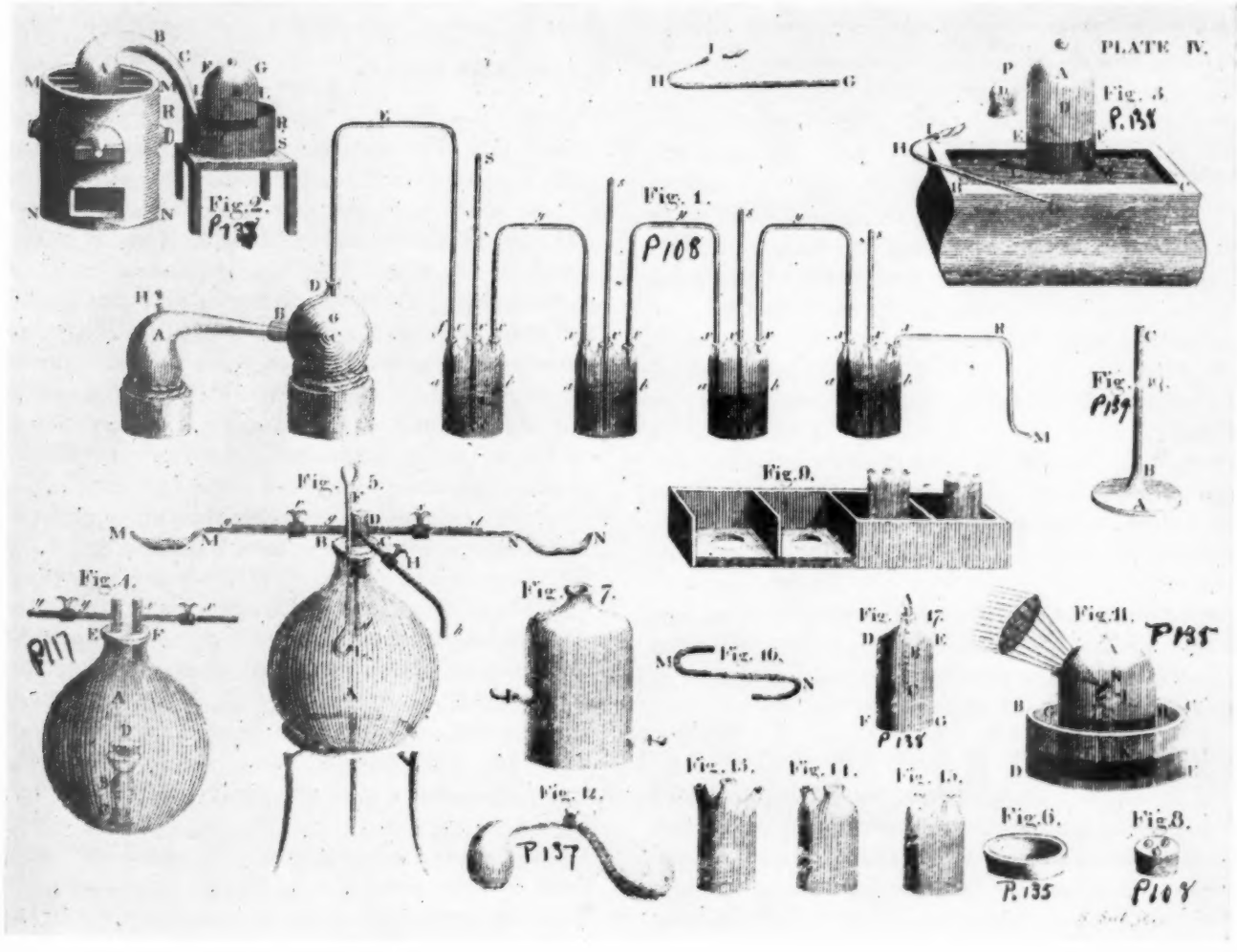
In recent years, the function of epinephrine, norepinephrine and 5-hydroxytryptamine, or serotonin, as mediators at the synapses of the nerve centers, has also been demonstrated.

Thus the nature of the functional junction between two neurons or between a neuron and a muscular or glandular effector cell was specified.

It would not be an exaggeration to say that such discoveries have revolutionized pharmacology in the second quarter of this century. Such substances as pilocarpine, arecoline or muscarine on the one hand, and amphetamine or ephedrine on the other hand, were considered as stimulants of the nervous fibers of the parasympathetic or sympathetic autonomic system. Today we know that these substances act directly on the muscular or glandular effector of these fibers as would their mediator. Also, substances such as atropine or ergotamine which used to be considered as blocking agents of one or the other category of the autonomic system fibers are now known to be antagonistic to the fibers' mediator substances at the effector organ.

Some apparatus used by Lavoisier while making observations upon "oxyds" and acids with compound bases; and on the composition of vegetable and animal substances

FROM ELEMENTS OF CHEMISTRY – IN A NEW SYSTEMATIC ORDER BY A. LAVOISIER VOL. I. PUBLISHED BY EVERT DUYCKINCK, NEW YORK, 1806.



Paul Ehrlich—aged about forty

FROM GALERIE HERVORRAGENDER AERZTE UND NATURFORSCHER. MUNCH. MED. WSCHR., 1914. APPEARS IN THE COLLECTED PAPERS OF PAUL EHRLICH, COMPILED AND EDITED BY F. HIMMELWEIT. PUBLISHED BY PERGAMON PRESS, NEW YORK, 1956.

Mechanism of Action

The mechanism of action of many pharmacodynamic agents can be explained by the intervention of a chemical mediator in the transmission of a nervous impulse, either from neuron to neuron or from neuron to muscular fiber. We can refer to:

► either a blocking of its synthesis at the level of the nervous fiber by inhibition of the forming enzyme (cholinacetylase).

► or a blocking of its catabolism by inhibiting the destructive enzyme (cholinesterase, monoamino-oxydase) which amounts to a strengthening of the mediator's effects (this is the case with eserine or iproniazid).

► or a blocking of its fixation or rather a liberation of the mediator from inactive complexes (this is the case with reserpine with regard not only to serotonin, but also to epinephrine and norepinephrine).

Pharmacology and the Basic Sciences

In the three examples I have mentioned, I wanted to emphasize the relation between pharmacology and the three basic sciences of physiology, organic chemistry, and biochemistry. The action of a drug on a living organism is due to its action on certain types of cell; this cellular effect can only be explained when one has sufficient information on the cell's normal functioning and thus its metabolism and chemical composition. Of course, such information was more or less inaccessible in Claude Bernard's time. As for Ehrlich's view of the process of fixation of a drug on chemoreceptors, this was entirely hypothetical, and carefully left unexplained the chemical nature of these receptors. On the other hand, if notable progress has been made during the last 40 years, it is in great measure due to advances in our knowledge of cellular metabolism, of the nature of the enzymatic processes involved, and of the action of certain activators and certain inhibitors of those enzymes. We can only hope to understand the mechanism of the action of a drug through a better knowledge of physiology and cellular biochemistry. But this does not mean that we should disregard the nature of the drug itself; on the contrary, we should pay close attention to the knowledge that organic chemistry gives us of molecular configuration if we want to understand more clearly the relationship between chemical structure and pharmacodynamic action.

In brief, physiology, organic chemistry, biochemistry and, I would add, biophysics are the four basic disciplines prescribed to those who intend to take up research in pharmacology.

Essentials for Research

After basic discussion let us now talk of techniques. It has been said that the research worker is a "one apparatus man" and some physicists are well known to have spent years and even a lifetime on the same experimental device, striving to perfect it, of course, from time to time. Why should this not be so in pharmacology? Obviously technique is becoming more and more specialized and a lot of patience is required to have a thorough knowledge of an apparatus or the working of an experiment. It should be normal and desirable that an experimenter used to a certain technique should apply it to the study of all the questions he is interested in.

Gone is the time when Claude Bernard could localize the action of curare with an induction coil, when the pharmacologist could solve most of his problems with Marey's tambor and Ludwig's kymograph. Today's techniques are more exacting, and it would be easy to think of many famous pharmacological discoveries that were achieved only with the help of the cathodic oscillograph, electroencephalographic technique or the implantation of microelectrodes into encephalic centers carefully located with stereotaxic devices.

Often the pharmacologist, like the physiologist, must build his own apparatus, and often it requires more time and more effort than the experiment itself; and

when electronics come into play it is amazing to see the scalpel—dear to Claude Bernard—replaced by the soldering iron!

Far be it from me, however, to give the impression that manual skill and a deep knowledge of the basic sciences are sufficient equipment for a research worker.

It is the same in pharmacology as in any other experimental research. "For a creation to take place," wrote Ribot, "first a need must awake, then stimulate a mental picture, and finally, objectify itself and take an appropriate form." This series of processes is not exclusive to pure intelligence which can perceive, remember, associate, dissociate and reason. Charles Nicolle never hesitated to proclaim that "the power of invention is an accident, a hazardous quality" with nothing to do with logic or reason, and that the research worker "should not allow in himself, and should destroy if he comes upon them, the bookish mind, ideas accepted without verification, dogmatic belief, and the respect of well-established theories."

Does it mean that the disposition for research is a natural gift, a hereditary quality outside of which there is no hope, even for the most conscientious laboratory worker?

These constitutional factors certainly have their importance but there are also others, no less necessary to the research worker, related to the influence of the social milieu and that of constantly renewed effort—that is, to work.

Nowadays more than ever, an invention is not strictly personal; most of the time it is the result of those intellectual osmotic currents that go round in a laboratory, and pass from one laboratory to another. "The best artists are developed by working in the studios of great painters," said Gaston Berger, "and it is in the confident and affectionate familiarity of the laboratory that the young scientists have found out about the joy of discovery. They have seen their professor hesitate, start again, fumble, get discouraged. They have seen in the flesh, honesty, conscientiousness, abnegation. This cannot be learned from a book."

Solid basic knowledge, advanced techniques, favorable surroundings and contacts are the things I want to underline as imperative for research and valuable as well for many branches of experimental science other than pharmacology.

Teaching Problems

Now, finally, we should ask ourselves if these favorable conditions for research are fully present in our country, or if certain reforms do not appear necessary to improve the actual state of our organization.

We have nothing to say on basic teaching. Organic chemistry, biochemistry, biophysics and physiology are taught in our faculties and I agree with my friend Professor Guillot that the pharmaceutical studies are an excellent preparation for research. However, it would be convenient to increase, within the framework of a 3rd cycle, the knowledge of anatomy and physiology for those of our students who intend to take pharmacology and perhaps also to create closer coordination between the teaching of the faculties of science, medicine and pharmacy.

As far as technique is concerned, we must accept the fact that it is not a major preoccupation at any level of our educational system—primary, secondary or college. Not until he has become a research worker does the student have to use his ingenuity and gift of observation to solve problems. From an educational point of view, this is a very serious deficiency.

To explain the lack of practical physiology teaching in our faculties we might perhaps cite the great number of students and the high cost of laboratory experiments on animals. The solution probably lies in the institution of a specialized teaching program, conceived in such a way that the ratio between professor and students would be closer to 1:10 than 1:100. Consequently, the students would be more carefully directed, followed and corrected, and finally judged by their talents and real capacities. Indubitably, it is by such means that we could encourage more of our pupils to find their vocation in this branch of science.

Finally, the favorable surroundings and contacts will be achieved if the research worker can depend on the presence and help of a tutor more attached to the activity of his laboratory than to the innumerable boards, councils, and committees on which he is insistently invited to sit, by the powers that be, even though these same powers that be call out for the expansion of research and the recruiting of more and more research workers. My friend, Professor Janot, has expressed some wishes on this subject, so I will not belabor the point.

Indeed we must make every effort to clothe the framework of our laboratories and make an "investment of men," as it was called by M. Longchambon, President of the "Conseil Supérieur de la Recherche Scientifique et du Progrès Technique" in a recent report. Evidently this implies a revision of the status of the research worker, to remove the handicap our laboratories have to put up with. I mean the unfortunate disparity between the positions offered by industry and those of the University or the research centers (C.N.R.S. or I.N.H.). Also this almost unrelenting dissipation of our activities must cease, for science needs reflection, freedom of mind and the availability of creative imagination.

I realize that these problems go beyond the subject of pharmacology, but I thought it advisable to call them to your mind because if we want to look into the future with confidence, we must reveal first the present imperfections and then honestly attempt to remedy them.

THE CANADIAN FORMULARY

by G. R. PATERSON

► CANADA HAS NEVER HAD A pharmacopoeia of its own. The publication of the first British Pharmacopoeia (in 1864)—a fusion of efforts previously expended individually on the London, Edinburgh and Dublin Pharmacopoeias—preceded Confederation by three years. After Confederation, most Canadian pharmacists used the pharmacopoeia of their mother tongue, while those close to the Canadian-American borders were influenced by the United States Pharmacopoeia. No book of standards existed for drugs of purely Canadian interest until 1905. Canada did, however, participate in the Indian and Colonial Addendum of 1900.

The Indian and Colonial Addendum 1900

Not until a fourth British Pharmacopoeia was needed was any serious effort made to create a truly imperial pharmacopoeia. In 1893, the General Medical Council initiated a program of seeking cooperation of the medical and pharmaceutical associations of India and the Colonies.[1] The Australian and Indian and other associations made suggestions that were embodied in a report distributed widely in the Empire. Canada made no suggestions at this time. Included in the recommendations from other parts of the Empire were "many locally important drugs for which local recognition only, within the respective areas of administration, was requested."[2] It was deemed unwise to delay publication of the 1898 revision to obtain, by slow correspondence, full information concerning these drugs and suitable pharmaceutical preparations for them.

Immediately following the issuance of the new pharmacopoeia in 1898, however, a movement was begun to procure "trustworthy descriptions of the drugs in question."[2] The descriptions were printed in "A Report on the proposed Indian and Colonial Addendum to the British Pharmacopoeia of 1898" and distributed to medical and pharmaceutical authorities in each of seventy areas of British administration. Nine such areas constituted "The North American Colonies," including the eight provinces of Canada (Saskatchewan and Alberta had not yet been formed from the Northwest Territories) and Newfoundland, which did not enter Confederation until 1949. Fifty-three of the 70 administrations communicated their views on this report to the General Medical Council. All 53 agreed in supporting the broad principle of imperialization of the British Pharmacopoeia. Attfield, the Editor of the Pharmacopoeia and of the Indian and Colonial Addendum, reported[2] that "the medical and pharmaceutical interests, in the Addendum, of the eight provinces of Canada are centered in an influential Committee sitting in Montreal." A study of this Committee is indicated.

J. E. Morrison of the Montreal College of Pharmacy and Editor of the *Canadian Pharmaceutical Journal* decided, after receiving Attfield's report, that Canadian use of a number of drugs not official in the British Pharmacopoeia, warranted his country's participation in the proposed Addendum. Noting "the peculiar condition of affairs which exist in Canada as regards the pharmacopoeias in use,"[1] Morrison recommended 28 drugs described in the United States Pharmacopoeia (1890 revision) and three others (one of them from the French Codex and prescribed widely in Quebec) that it would be advisable to include in a Canadian Addendum if such were to be published.

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Moraine Lake—Valley of the Ten Peaks, Banff National Park, Alberta, Canada

Morrison's suggestions were presented by Dr. J. C. Adami, President of the Montreal Medico-Chirurgical Society, to the thirty-second annual meeting of the Canadian Medical Association held in Toronto in August, 1899.[3,4]

The secretary of the Montreal Medico-Chirurgical Society, Dr. A. T. Bazin, had sent copies of Morrison's suggestions to medical and pharmaceutical societies across Canada in May, 1899. No criticisms or suggestions of additions or improvements were received by the Canadian Medical Association up until the time of the annual meeting in August.[3] Consequently, the draft report of the Montreal group was read before the Canadian Medical Association. The latter body, representing the Canadian medical profession, nominated to consider and amend the report, a committee of 13 representatives of medicine and pharmacy, with Dr. Adami as chairman, Dr. Bazin as secretary, and including also Dr. A. D. Blackader, Professor of Pharmacology, McGill University, Montreal; Dr. Robert Wilson, Professor of Pharmacology, Bishop's College, Montreal; Dr. H. Hervieux, Professor of Pharmacology, Laval University; Dr. J. T. Fotheringham, Professor of Materia Medica and Pharmacognosy, Ontario College of Pharmacy, Toronto; Henry Watters, Ottawa, Past President and member of the Council, Ontario College of Pharmacy; A. Robert, President of the Pharmaceutical Association of the Province of Quebec; W. H. Chapman, President of the Montreal College of Pharmacy; Dr. T. D. Reid, Mr. J. E. Morrison and Mr. J. W. Lecours, Professors at the Montreal College of Pharmacy; and Mr. A. B. J. Moore, chemist for Messrs. Evans, Sons. and Co., Montreal. This committee revised the Montreal report, and made recommendations with supporting arguments. Before submitting the report to the General Medical Council of the United Kingdom, the pharmaceutical bodies of the country were given an opportunity to review the recommendations again critically.[4] Twenty-eight drugs and preparations were recommended for inclusion in the Indian and Colonial Addendum. By implication at least, the Committee felt that it or a succeeding committee would continue to function with respect to the next revision of the newly imperialized British Pharmacopoeia.

The recommendations were adopted by the General Medical Council with but little change.[5] Some monographs were included in the Addendum; the remainder were taken under consideration for adoption into the main body of the Pharmacopoeia. Morrison was able to write at this stage that, "The Canadian Pharmaceutical Journal can justly claim credit of having taken the initiative in giving us a Canadian Addendum."[5]

The statutory notice of publication of the Indian and Colonial Addendum 1900 to the British Pharmacopoeia 1898, appeared in the London Gazette, December 28th, 1900.[6] The General Medical Council regarded the Addendum as "to a certain extent provisional, as it represents but a further step towards the production of a complete Imperial Pharmacopoeia."[7] The North American Colonies represented one of seven pharmacopoeial divisions of the Empire. An editorial in the *Pharmaceutical Journal* of Dec. 8, 1900[8] referred to the turning of the British Pharmacopoeia "into a work of what may be termed Imperial scope" by means of the new Addendum, and gave Dr. Attfield, the Editor of the Addendum and of the Pharmacopoeia, much of the credit for the whole concept of imperialization of the Pharmacopoeia, an idea he first advanced officially in 1886.[9]

The Addendum (or that portion of it concerning Canada) did not meet with a completely favorable reception in Canada. The *Canadian Druggist*[10] felt the Addendum did not fulfil its mission of practical use in Canada. "Our peculiar situation makes it indispensable that the preparations of the 'United States Pharmacopoeia' and the 'French Codex' should be recognized as authorized preparations, and no work will be complete as a 'Canadian Pharmacopoeia' which does not embrace a large number of the leading preparations of these text-books."

Perhaps inherent dissatisfaction with a colonial status in any imperial pharmacopoeia, and the presence of a member of the faculty and a member of the council of the Ontario College of Pharmacy on the Canadian Medical Association's Addendum committee, may explain the next event leading to the publication of a new book of Canadian standards in 1905.

Special Committee on Pharmaceutical Research, Ontario College of Pharmacy

At the semi-annual meeting of the Council of the Ontario College of Pharmacy in August, 1902, it was moved by R. A. Harrison, seconded by John Hargreaves, "that a special committee be appointed consisting of Messrs. John Hargreaves, W. A. Karn, E. W. Case, A. Turner and R. A. Harrison, to consider and report at the next session of this Council on the advisability of adopting some plan of original investigation and research, and endorsing and recommending certain standard formulas." The motion was approved unanimously and the committee set up.[11] In support of his motion, the mover reported that he had consulted with Dean C. F. Heebner who endorsed the idea. Mr. Harrison spoke of the advantages of encouraging such research, stating it would be very useful to the physicians if standard formulae could be adopted for antiseptic washes and similar preparations.[12]

The special committee (John Hargreaves, spokesman) reported at the next meeting of Council as follows:

After careful enquiry into prevailing conditions that exist in regard to numerous unofficial pharmaceutical formulae among the pharmacists and physicians of Ontario, your committee is convinced that some effort and encouragement is required and should be earnestly devoted to the purpose of establishing uniformity in pharmacy, encouraging and advancing individual knowledge and manufacture of galenicals by the graduates and members of our College. This is essential for the maintenance of the technical skill and practical knowledge of the members of our College and almost absolutely necessary for the experience and education of the future students of pharmacy. We believe that it is imperative on the part of every active and intelligent pharmacist to manufacture any and every preparation practicable in pharmacy.

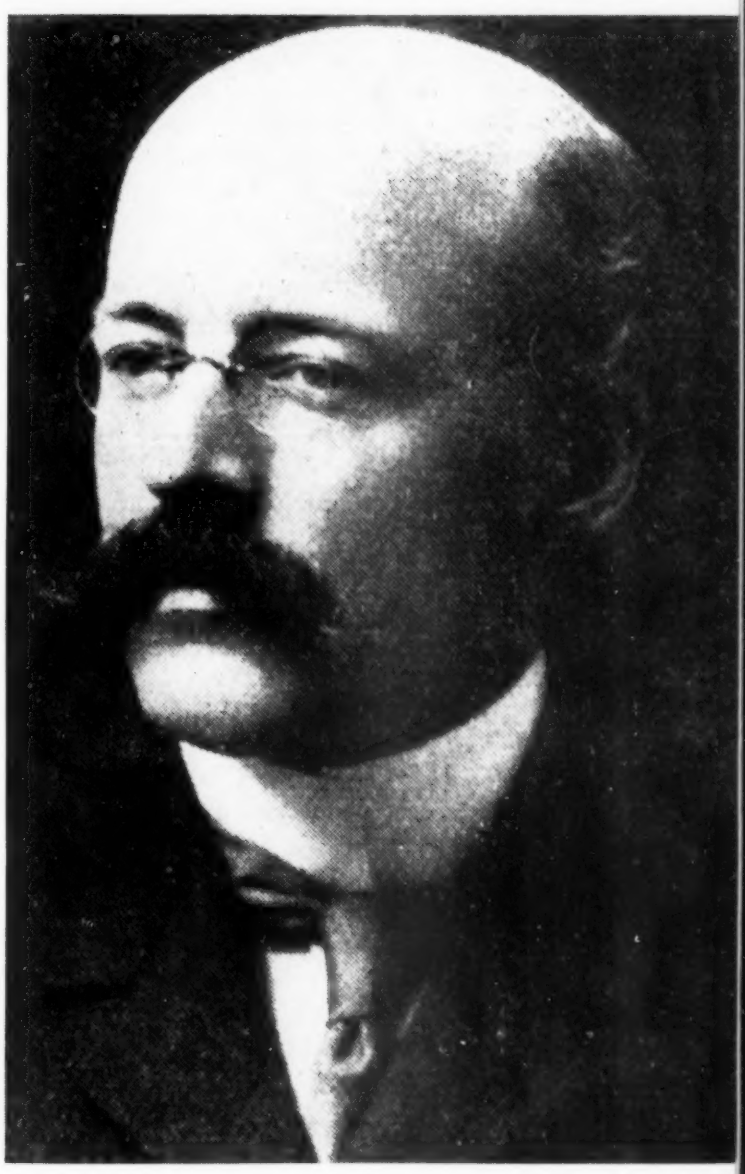
The adoption and authorization by the College of many unofficial preparations that have come into such general practice as almost to be recognized as official in some localities will be of great assistance in revising present formulae and may become the nucleus of an official and uniform formulary for Canada under the recognition of the Ontario College of Pharmacy. This would be a step in the direction of advancing and benefitting the practice of both pharmacy and medicine in this province.

Believing that such investigation would be equally useful and beneficial to the practice of medicine and pharmacy, we recommend that the College of Physicians and Surgeons be requested to co-operate and assist in any endeavour to have pharmacy and medicine put forth their efforts to establish uniformity of pharmaceutical preparations.[13]

To accomplish these aims, the special committee proposed a change of by-laws to provide for a sixth standing committee of Council, to be called the Pharmaceutical Research Committee (of three members) and recommended authority be given it to confer with a committee to be appointed by the College of Physicians and Surgeons of Ontario. The special committee further recommended it be instructed "to obtain all possible information in regard to unofficial formulae, with the object and intention of compiling a small book of formulae to be authorized and adopted by O.C.P., such book of formulae to be sent to the members of our College and to members of the College of Physicians and Surgeons practicing in Ontario as soon as possible after its adoption and publication by the Council.

"That additions to and revisions of such formulae shall be constantly and regularly investigated and carried on by the Pharmaceutical Research Committee under the authority of the Council.

"That the compilation of an official book of formulae shall be completed and placed in the hands of the members of the O.C.P. before the investigation and authorization of new and specific formulae be proceeded with as set forth hereafter." The machinery proposed for additions and revision was to be a decision at each Council session concerning formulas which required investigation, followed by a request to all



Professor Joseph E. Morrison (1862-1913) was largely responsible for Canadian participation in the preparation of the Indian and Colonial Addendum. A prominent pharmacist of Montreal for 25 years, he served as manufacturing chemist for Lyman Sons & Co., examiner of the Quebec board and as lecturer and later Dean of the Montreal College of Pharmacy. In 1896, he became the second Canadian to be honored with the presidency of the American Pharmaceutical Association

members of the Ontario College of Pharmacy and the College of Physicians and Surgeons of Ontario for information and experimentation. Finally there would be consideration of the collected formulas by the two committees who would report results of their enquiry to the Council of the Ontario College of Pharmacy. Adoption of the formulas by Council was to be a necessary prerequisite to publication, and the booklet when prepared was to be a text for the students of the College.

At the August, 1903 Council meeting, a Special Pharmaceutical Research Committee of John Hargreaves, W. A. Karn, Henry Watters, E. W. Case, and R. A. Harrison was named. John Hargreaves reported[14] that a copy of the report of the previous session had been sent to the secretaries of the Pharmaceutical Associations of Quebec, Manitoba, Nova Scotia, British Columbia and the Northwest Territories and also to the secretaries of the Ontario Medical Association, the College of Physicians and Surgeons of Ontario, Toronto Medical Society and Toronto Pathological and Chemical Societies. "A small book of Formulae similar to that of the National Formulary of the U.S." was envisaged in Mr. Hargeaves' report. Directives were requested concerning a name for the book, the method of obtaining formulas and of distributing the proposed formulary.

When the Pharmaceutical Research Committee next reported to Council in February, 1904, John Hargreaves, Chairman, read into the record a copy of the letter which had been sent to the aforementioned bodies, and stated that endorsing replies had been received from most.[15]

> In February of this year the Council of the Ontario College of Pharmacy adopted a report of a Special Committee, which was subsequently forwarded to you recommending that steps be undertaken to arrange for the compilation of useful formulae, advising that all Canadian Pharmaceutical Associations and other interested bodies be invited to assist and co-operate in the work. In August last the Committee was instructed to continue to enlist the co-operation of interested bodies, and to proceed to obtain information necessary for the compilation of a small book of formulae similar to the NATIONAL FORMULARY of the United States.
>
> We recognize in Ontario that many preparations frequently prescribed by the medical profession and that are in demand by the public having no definite standard formulae, in many localities, vary and differ in strength, appearance and other characteristics, to an extent that incurs frequent causes of trouble and inconvenience. With the intention of creating greater uniformity in many Pharmaceutical preparations, and with the further object in view of the compilation and authorization of some official Formulary that will regulate a standard of strength, purity and skill, much to be desired by Pharmacists throughout all Canada, you are again requested to consider the advisability of assisting in the construction of a work that would be equally valuable in all localities in the Dominion, and that should be more successful and satisfactory in proportion as the general interests involved are discussed and considered by the various Pharmaceutical bodies appointed or elected to regulate and enact legislation for such questions.
>
> We recognize the necessity for a uniform Canadian standard for Pharmaceutical preparations that will signify and regulate a quality of excellence that must be complied with by any and all manufacturers, and that will demand scientific training, a thorough knowledge of drugs and experience in chemical manipulation to produce the perfection indicated by the formulae.
>
> We believe that the compilation of such a formulary is an advanced step, requiring most careful and mature consideration, and though we admit the medical professions are equally interested in such an undertaking it is our duty as Pharmacists to endeavor to regulate and authorize such formulae as should be generally prepared by Pharmacists for the use of the medical profession.
>
> All the advantages are in favor of the adoption of some more uniform method along the line indicated, and we earnestly desire that our labors shall be Canadian and not confined to Ontario. We would appreciate an expression of your views on this question at as early a date as convenient, in order that our Council may give it some further consideration when they convene next February.
>
> W. B. Graham, President — John Hargreaves
> Ontario College of Pharmacy — Chairman of Committee

In August, 1904, a decision was reached with respect to the name of the book of formulas. It was to be called "The Canadian Formulary" and it was to be published under the authority of the Pharmaceutical Associations of Canada.[16] The Pharmaceutical Research Committee referred to the proposed book as "an official Formulary composed of medicinal, pharmaceutical and chemical formulae." It was further proposed that each participating association appoint a Pharmaceutical Research Committee to collect, test and approve formulas with respect to title, external appearance, taste, uniform composition, reliable effect and stability, and that the chairmen of the various Research Committees form a central committee to be called the Executive of the Research Committees. This latter body was to carry out final inspection of formulas prior to adoption and publication, on or before January 1, 1905. It was also suggested that a trial pamphlet containing "fifty or more such perfect formulae" together with a preface stating fully the object and reasons for publishing "The Canadian Formulary," be circulated to physicians and pharmacists. Chairman John Hargreaves then appended to his report a partial list of formulas desired by his committee.

The objective of publication by January 1, 1905 was not reached, but the Formulary appeared before the end of the year. In the Council meeting of February, 1905, Mr. R. A. Harrison, Chairman of the

Divisional (*i.e.* Extension) Committee, suggested that the formulas of the Research Committee be submitted to the members of the College at the various Divisional Meetings for discussion.[17] The only provincial association other than the Ontario College of Pharmacy to appoint a committee to assist in the proposed work of the Canadian Formulary was the Pharmaceutical Association of the Province of Quebec.[18] The Pharmaceutical Research Committee acknowledged assistance from Dean C. F. Heebner, the Pharmacy Committee of the Toronto Druggists and several members of the College. The Committee also stated the sources of many of their formulas. Included among the sources were the *Year Book of the British Pharmaceutical Conference,* the *Extra Pharmacopoeia, Squire's Companion to the British Pharmacopoeia,* the *Pharmacopoeia of the London Hospitals* and the *National Formulary* of the United States. It would appear that the Committee still hoped for cooperation and endorsement from the other pharmaceutical associations and from the medical profession in Canada, and expected to delay publication until August at least.

However, when the Pharmaceutical Research Committee reported to Council in August, 1905[19] they announced surprisingly the publication in March, 1905[20] of a pamphlet entitled "A Compendium of Canadian Formulary" comprising 24 pages and 68 formulas. The booklet was sent to all members of the College and to the other pharmaceutical associations of Canada with a request for investigation and criticism.[19] The Committee reported a fine reception for the product of their labors, particularly at Divisional meetings. Pharmacy committees to assist the Research Committee in its further work were reported to have been set up in some electoral divisions of the province. Regretfully the Committee report spoke of misunderstanding of their objects and desires on the part of the College of Physicians and Surgeons of Ontario.

Gibbard[20] reflected in an editorial in the March 1905 issue of the *Canadian Pharmaceutical Journal* the thinking of many practicing pharmacists concerning the reasons for issuance of the Compendium.

> We apprehend that there is no occasion to enlarge on the necessity of issuing this publication, as such must be apparent to every thoughtful pharmacist.
>
> Apathy and the lack of "knowing how" on the part of the pharmacist has permitted the large pharmaceutical manufacturing firms to usurp almost his entire functions as a compounder and dispenser of medicines, and rendered the possession of technical knowledge and skill a superfluity.
>
> Pouring out proprietary preparations and counting 'store pills' is scarcely the employment contemplated by those who provide equipment and facilities for the training of our young men, and those who impart information for the purpose of fitting them for a life calling.
>
> Uniformity of strength, appearance and manufacture is another crying need. The market is deluged with such a flood of Syrups, Elixirs and Extracts, varying in strength and merit, according to the ability, knowledge and honesty of the various manufacturers, that the disgusted pharmacist is prompted to "take to the tall timbers," and the careful physician must pray with fervency "good Lord deliver me from my friends."

Reception of the Formulary by pharmacists appears to have been good, whereas it met with less favorable attention from most physicians, probably through lack of knowledge. It did represent the culmination of three years of hard work and negotiation by John Hargreaves and the members of his committee, and it was the first of five editions of the Canadian Formulary to be issued under the authority of the Ontario College of Pharmacy. To John Hargreaves, much credit is due.

Revisions by the Ontario College of Pharmacy

Valuable criticisms of the "Compendium of Canadian Formulary" from the Pharmaceutical Association of the Province of Quebec were reported to the December 1905 meeting of the Council of the Ontario College of Pharmacy.[21] It was also reported that all formulas contained in the Compendium had appeared in the book of "Pharmaceutical Formulas" published by the *Chemist and Druggist,* with each such product being designated "C.F." (Canadian Formulary).

Within the next few years, the Formulary acquired more influence, so that a second edition became desirable. This work was accomplished in January, 1908 with the aid of a Research Committtee of the Pharmaceutical Association of the Province of Quebec, (W.H. Chapman, Chairman; J.E. Morrison, A.B.J. Moore, H.R. Gray, A.E. Duberger, A.J. Lawrence, H. Lanctot, J.E.W. Lecours).[22] A printing of 2,500 copies was soon exhausted attesting to the popularity of the work.[23]

George E. Gibbard, President of the Ontario College of Pharmacy in 1908, Editor of the *Canadian Pharmaceutical Journal* and one of the founders of the Canadian Pharmaceutical Association the previous year,[24] reported to the College Council[23] that responsibility for future publication of the Formulary had been assumed by the Canadian Pharmaceutical Association, with responsibility for revision remaining in the hands of John Hargreaves, the chairman of the College Research Committee. Gibbard also noted that application had been made to the federal government, seeking the approval of the Minister of Inland Revenue, thus complying with the recently-enacted Proprietary and Patent Medicines Act. Gibbard, appointed one of three delegates of the Ontario College of Pharmacy to found the Canadian Pharmaceutical Association in 1907, had expressed as one of the aims of the Association, "to promote the intention of the Canadian Formulary as an official standard

for approved formulas of preparations not authorized by national standards."[25]

The Research Committee of the Ontario College of Pharmacy regarded the adoption and acceptance of the Formulary by the Canadian Pharmaceutical Association as giving it legal status with "an authority equal to any Pharmacopoeia authorized in Canada." The Committee also raised the question of serious consideration of future publication and ownership of the Formulary by the Dominion Association.[26] However in June, 1909, Gibbard, still president of the Ontario College of Pharmacy, reported that the federal government had not granted the status requested for the Formulary by its owners in the following words:

> It is to be regretted that the Government at Ottawa has not accorded this work the approval which should have been extended to it and which we confidently look for. I am confident that this approval has been withheld due to the lack of knowledge of the purpose of the Formulary and a mistaken notion entertained by the Department that it is a book of recipes for the manufacture of proprietary articles and Nostrums. When this mistaken notion shall have been removed from the minds of those in authority, I have no doubt that the Formulary will be accorded the position it deserves as that of the first Canadian standard authority.[27]

The long-sought cooperation of physicians was obtained in 1909 with the appointment of a Joint Committee from the Ontario Medical Association and the Ontario College of Pharmacy to consider "the growing evil arising from the multiplicity of remedies of a proprietary nature.[28] The Research Committee made good use of this contact with the Ontario Medical Association to explain the purposes and advantages of the Canadian Formulary. The physicians' committee agreed to bring the Formulary to the attention of the members of their own association, of the members of the Canadian Medical Association, and to attempt to ensure its use as a book of instruction by medical students in the Colleges.[29] When the third edition of the Canadian Formulary appeared in March 1910, no recognition was accorded the medical committee. Apparently the cooperation obtained fell short of that desired. The committee of the Pharmaceutical Association of the Province of Quebec was again acknowledged.[30] The new edition did not bear any reference to the Canadian Pharmaceutical Association, although the 1910 meeting of that body again adopted and approved it.[31] The 1915 and 1921 revisions appeared with the imprint "approved and adopted by the Canadian Pharmaceutical Association," but with no reference to the Quebec committee.

The Canadian Pharmaceutical Association Assumes Responsibility for the Canadian Formulary

Early in the history of the Canadian Formulary, its editor, John Hargreaves, expressed the hope the work of compiling its formulas would be done by representatives of all the provinces. The Canadian Pharmaceutical Association, consisting of the provincial pharmaceutical statutory bodies, did approve and adopt it.

With the publication of the 1921 edition, the federal government acknowledged the Formulary as "a standard under the Proprietary and Patent Medicine Act."[32] The Canadian Pharmaceutical Association then showed more interest in assuming full responsibility for the work. The Council of the Ontario College of Pharmacy put itself on record as favoring this change of ownership but suggested safeguards for continued publication of the Formulary if the Association were not to live up to any responsibilities it might assume.

The federal government was next asked to place the Formulary on the list of standards of the Department of Customs and Excise.[33] This status (equal to that of the *British Pharmacopoeia,* the *United States Pharmacopeia* and the *Codex Medicamentarius* of France) was granted for all Canadian Formulary preparations with the exception of those (and they were named) which were suitable for beverage purposes.[34]

After several years of negotiation, with the College and Association each setting up special committes to deal with the matter, the College committee in June, 1924 laid down conditions for surrendering their property and rights in the Canadian Formulary to the dominion association.[35]

> (a) The C. Ph. A. to defray the total cost of permanent investment entailed by this College together with the copies of Formulary on hand at the time of transfer.
>
> (b) This College to be supplied at cost with copies of Canadian Formulary required each year to be presented to the members of the graduating class as long as we desire this practice.
>
> (c) In the event of the C. Ph. A. not functioning, it is to be understood and agreed, that all rights and property in the Canadian Formulary will automatically revert to the original ownership of this College.
>
> (d) Your Committee wish to further suggest, that in view of the fact that we have at present a large number of copies of the Canadian Formulary on hand, we think it expedient to postpone the actual consummation of the transaction until a later date, giving us an opportunity to dispose of the copies on hand, provided this suggestion is agreeable to the C. Ph. A.

Apparently the time was deemed ready for transfer of the Formulary to the Canadian Pharmaceutical Association in 1928[36]—for the College's delegates to the Association's annual convention were instructed to determine definitely the Association's intentions with respect to the book of standards. The Association accepted the College's terms in accordance with the following letter:[37]

I am instructed by the Council of the C. Ph. A. to inform you that we are willing to accept the proposal as outlined by Messrs. MacFarlane and Hoag referring to the transferral of the "Canadian Formulary" by the Ontario College of Pharmacy to the C. Ph. A. upon the following terms:

First, we are willing to purchase all rights and privileges now owned by the O.C.P. for the sum of One Dollar, which will include our stock of plates, cuts, etc. The C. Ph. A. in turn must sell from time to time to the O.C.P. the number of copies they may require to give to their graduating class each year at cost. It is also understood that in case the C. Ph. A. fails to function by printing the "Canadian Formulary," the said C. Ph. A. agrees to return to the O.C.P. all rights, privileges, cuts, etc., in their possession.

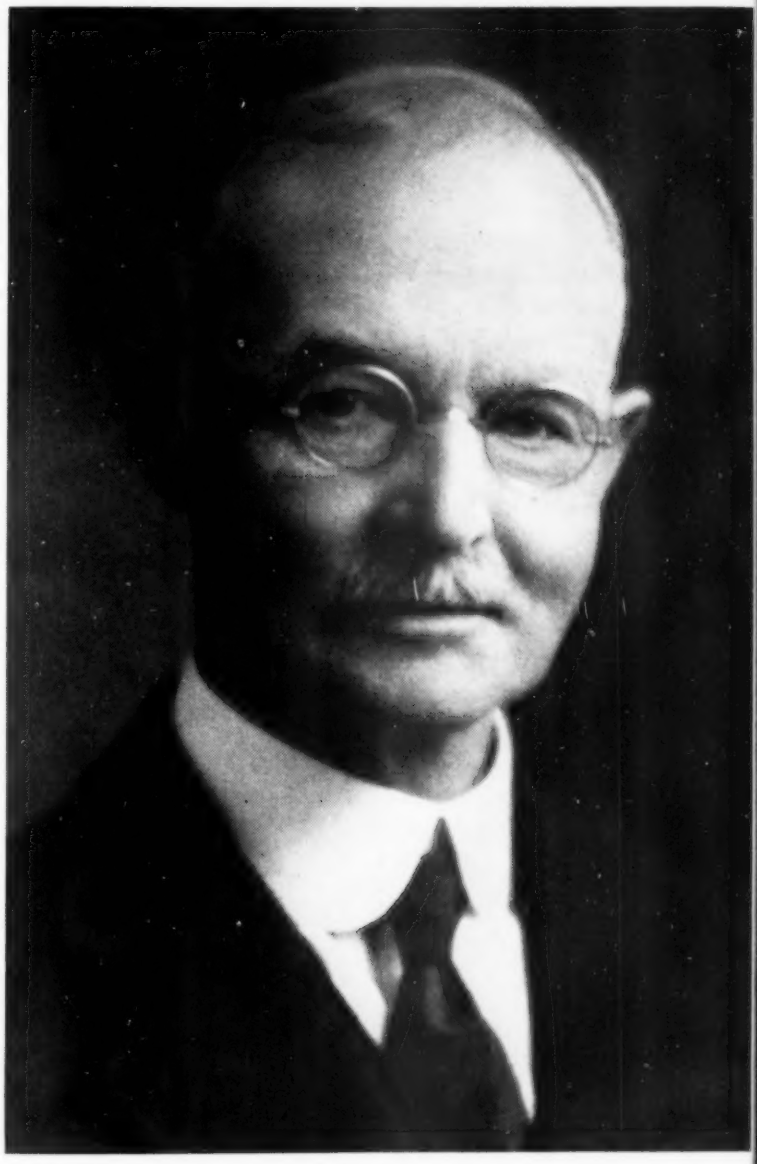
Second, we would advise that Mr. F.S. Mearns be instructed to prepare an agreement on the above lines to be submitted to the C. Ph. A. and O.C.P. for signatures by their respective officers.

R.J.B. Stanbury,
Secretary, C. Ph. A.

Formal agreement was reached July 18, 1929, transferring responsibility for the Canadian Formulary to the dominion association.[38] With this event the Ontario College of Pharmacy, which had published five editions of the Canadian Formulary in 24 years, ceased to have the major interest in the book. However, the College continued to be much interested in revision of the book it had begun.

The Canadian Committee of Pharmaceutical Standards and the Canadian Formulary, 1933

On September 1, 1925, the General Medical Council of Great Britain (charged with the responsibility of revising the British Pharmacopoeia) invited Canada and the other countries of the Empire to participate in the preparation of a new pharmacopoeia.[39] The Department of Health, Ottawa communicated this invitation to all interested federal and provincial medical and pharmaceutical groups. From the first, attempts were made to coordinate the views of the Canadian Medical Association, the Canadian Pharmaceutical Manufacturers' Association, and the Canadian Pharmaceutical Association to give greater weight to Canadian opinions. A joint committee (Dr. V. E. Henderson, Chairman of the Committee on Pharmacy of the Canadian Medical Association; Dr. T.C. Routley, Secretary of the Canadian Medical Association; Dean G.A. Burbidge, Chairman of the Council of the Canadian Pharmaceutical Association; Dr. R. B. J. Stanbury, Secretary of the Canadian Pharmaceutical Association; and Mr. W.H. Thom, Secretary of the Canadian Pharmaceutical Manufacturers' Association) in a report to the General Medical Council March 20th, 1926, noted the generally unsatisfactory character, from the Canadian point of view, of the



John Hargreaves (1855-1930) was a member of the Council of the Ontario College of Pharmacy and its president in 1909, and became the first Editor of the Canadian Formulary. With his brother, he founded the Hargreaves Syndicate, out of which grew the Drug Trading Company, North America's largest drug wholesaler. He helped organize the Canadian Pharmaceutical Association in 1907

previous (1914) edition of the British Pharmacopoeia. The committee requested that Canada be given "direct representation on any committee finally revising the British Pharmacopoeia," and that the pharmacopoeia "contain only such drugs and preparations as are in general use throughout the Empire, *i.e.* that it should not contain drugs and preparations intended for special parts of the Empire." The latter were best left for addenda, in the committee's view. A list of recommended deletions from and additions to the 1914 Pharmacopoeia was appended to the report.

In January, 1927, the committee approached the Hon. J. H. King, Minister of Health in the federal government, to place before him these views and ask that the government recognize the committee by appointing to it an official of the Department of Health. On behalf of the government, the Minister appointed Dr. H.M. Lancaster, Chief Analyst of the Department of Health, to what was henceforth designated the Canadian Committee on Pharmaceutical Standards.[40] This committee consisting of six members designated by the Canadian Medical Association, eight by the Canadian Pharmaceutical Association and one (Dr. Lancaster) by the government, served as the channel through which Canada's opinions reached the General Medical Council.

As the work of revision proceeded, it became evident to the Canadian Committee on Pharmaceutical Standards that some drugs still much used in Canada were to be deleted from the 1914 Pharmacopoeia, and that certain nonofficial drugs, also of importance to Canada, would not be recognized in the new pharmacopoeia. Differing standards also served as a compelling reason for issuance of a Canadian Addendum to the British Pharmacopoeia.[41] As early as April 1926, Dean G.A. Burbidge, Chairman of the Council of the Canadian Pharmaceutical Association, suggested the work of the joint committee of the Canadian Medical Association, the Canadian Pharmaceutical Manufacturers' Association, and the Canadian Pharmaceutical Association might also embrace the preparation of a new Canadian Formulary.[42] After the latter body acquired the Canadian Formulary, it asked the Canadian Committee on Pharmaceutical Standards to revise the Formulary.

The new British Pharmacopoeia appeared in 1932. The new Canadian Formulary, the Canadian Addendum to the British Pharmacopoeia 1932, and the Reference Companion were published in one volume the following year. "Section I - Formulary Section" contained a selection of formulas for the practicing physician. The formulas were also capable of serving as a "basal Pharmacopoeia for a Hospital." The section was intended to be official (the letters "C.F." were an integral part of the titles "so that a physician prescribing by the Latin title should receive the ingredients called for in their proper proportions." It is interesting to note that a medicinal use was expressed for almost every one of the 60 formulas.

"Section II - The Addendum" was designed as an Addendum to the British Pharmacopoeia, 1932 and as such was official in Canada. It contained monographs for such drugs or preparations as[41]

> (a) have been deleted from the British Pharmacopoeia 1914 in the 1932 revision, which the Canadian Committee considers are so extensively used in Canada as to warrant their retention.
>
> (b) have been judged worthy of retention from the Canadian Formulary 1915.
>
> (c) certain substances and preparations included in in the British Pharmacopoeia 1932, which in view of the regulations of the Food and Drugs Act of Canada 1927, require restatement for Canada; or which can readily be obtained in Canada in a higher state of purity than required by the British Pharmacopoeia 1932.
>
> (d) certain modifications of preparations contained the British Pharmacopoeia 1932 which seem more in harmony with Canadian usage.
>
> (e) certain substances or preparations either original or not recently official in Canada, which were required as ingredients in Sections I or II, and were considered as generally useful.

It contained seventy-two monographs, representing a considerable revision of and addition to the contents of the 1932 British Pharmacopoeia.

The third section, the Reference Companion, was not in any sense official. It brought together formulas for preparations known by the name of the originator or by some common English name. As such it was merely a source of information to Canadian physicians and pharmacists.

The sixth Canadian Formulary represented a considerable departure from the style of its predecessors and a return (as far as Section II was concerned) to that of the Indian and Colonial Addendum 1900 to the British Pharmacopoeia 1898. Perhaps because of the presence of the Addendum within the same covers, this Canadian Formulary acquired considerable influence and wide usage in the next decade.

The Canadian Supplement, 1944, to the British Pharmacopoeia

In April, 1942, representatives of the Canadian Medical Association, the Canadian Pharmaceutical Manufacturers' Association and the Canadian Pharmaceutical Association met with Dr. R.E. Wodehouse, Deputy Minister of Pensions and National Health, to clarify the status (it was felt such a committee should have legal status) of the Canadian Committee on Pharmaceutical Standards with respect to modifications to the British Pharmacopoeia 1932 standards. By Order-in-Council, dated June 5, 1942, the government established a new committee to be called the Canadian Committee on Pharmacopoeial Standards, to consist of two representatives each of

the Royal College of Physicians and Surgeons of Canada, the Canadian Medical Association, the Canadian Pharmaceutical Association, the Canadian Pharmaceutical Manufacturers' Association, the Department of Pensions and National Health, and the Chief Dominion Analyst who was to be chairman.[43] The duties of the Committee were defined as:

> (a) To advise the Department of Pensions and National Health with regard to any modifications to the British Pharmacopoeia which are considered to be necessary in the public interest.
>
> (b) Upon request of the Department of Pensions and National Health, to advise that Department with regard to regulations proposed to be made under Section 6 of the Food and Drugs Act respecting any drug included in Section B. of the said Act.

Folllowing the first meeting of the new Committee, an Order-in-Council declared the second and subsequent addenda (at this time totaling six addenda) to the British Pharmacopoeia were not to be regarded as amendments to the Pharmacopoeia for the purposes of the Food and Drugs Act. These addenda dealt largely with modifications in official drugs and preparations made necessary by wartime shortages in the United Kingdom and were not suitable to Canada.[44]

The Canadian Committee on Pharmacopoeial Standards sought to fill the void caused by lack of Canadian standards for newer drugs and to replace the Addendum Section of the Canadian Formulary 1933. It is interesting to note that in an interim report[45] A.L. Davidson, Secretary of the Canadian Committee on Pharmacopoeial Standards, reported some speculation on the future of the Canadian Formulary as follows:

> It was understood that the Canadian Formulary was likely to be continued in a new and enlarged form. It would consist of the three sections as before. The possible advent of National Health Insurance left some doubt as to what would be expected of the Formulary section but it was anticipated that it would be extended. The Canadian Formulary proper (including the old Addendum section) would contain drugs which warrant some recognition, but which are not sufficiently important to be included in the Canadian Supplement. It was also stated that the Canadian Pharmaceutical Association was anxious to amplify the Reference companion section of the book.

Davidson explained[46] Schedule B of the Food and Drugs Act as follows:

> Schedule B made its debut in 1927 in the process of amending the Act of 1920. In various parts of the world, steps had been taken to control the manufacture and quality of therapeutic substances of animal and bacterial origin and the arsphenamines, for which pharmacopoeial specification was not deemed sufficient. Moreover, certain other drugs of vegetable origin, notably digitalis, were falling into disrepute owing to the unreliability of their preparations. Such drugs did not lend themselves to standardization by chemical methods and recourse had to be had to biological assay. An International Conference which met in Brussels in 1925 for the unification of standards for potent drugs, drew up an International Protocol which provided, *inter alia,* for the biological assay of digitalis and ergot. So when the Food and Drugs Act was amended in 1927, provision was made for establishing Canadian standards for these substances, which standards constitute Division II of the Regulations made under the Act and are paramount in this country.

On April 11, 1944, the Department of Pensions and National Health Ottawa, published The Canadian Supplement, 1944 to the British Pharmacopoeia (Division III of the Regulations under the Food and Drugs Act) by Order-in-Council P. C. 2515.[47] It consisted of 56 monographs as well as additions to five of the appendices of the British Pharmacopoeia 1932. It superseded the Addendum Section of the Canadian Formulary 1933, and replaced the second to sixth addenda to the British Pharmacopoeia 1932. It marked a forward step in Canadian legislation respecting drug standards. The First (and only) Addendum to the Supplement appeared August 28, 1945. It contained ten monographs on cardiac drugs and their preparations.[48]

The Canadian Formulary, 1949

J.W. Preston, Secretary of the Canadian Pharmaceutical Association, convened a meeting in Toronto in June, 1945 to consider possible revision of the Canadian Formulary, 1933.[49] Attending the meeting were four pharmacy educators, Dr. A.W. Matthews of the University of Alberta, Dean E.L. Woods of the University of Sasketchewan, Dean R.O. Hurst and Professor F.N. Hughes of the Ontario College of Pharmacy, and two Toronto retail pharmacists, John Burgess and A.A. Brown. A decision was taken to proceed with revision of the Formulary. It was decided also that "it should contain rubrics for drugs which were considered necessary, based on the extent of use, as well as formulas for approved preparations,"[49] and that the newly-formed Canadian Conference of Pharmaceutical Faculties[50] be asked to undertake the revision.

This proposal that the Conference revise the Canadian Formulary was made by the Council of the Canadian Pharmaceutical Association to the Conference in August, 1945, the Council expressing the view that the geographical distribution of the constituent facilities of the Conference made the latter the ideal body to undertake the task. The Conference accepted the responsibility, and immediately set up a number of sub-committees to deal with the various types of preparations which might be included in the new Formulary. The sub-committees were distributed among the constituent members in accordance with their personnel and facilities for research.[51] Each sub-committee was charged with responsibility for

recommendations concerning inclusion of substances or preparations in the Formulary, the recommendations to be based upon surveys in all provinces.

The central Canadian Formulary Committee was made responsible for "final approval of inclusions and for the publication of the Book."[51] This editorial committee consisted of the president and secretary of the Canadian Pharmaceutical Association, two representatives of the Canadian Pharmaceutical Manufacturers' Assocation, two representatives of the Canadian Conference of Pharmaceutical Faculties, and the Formulary editor who was to be convener of the committee. The editor selected was Dr. A.W. Matthews (formerly Director of the School of Pharmacy, University of Alberta and since 1952, Dean of the Faculty of Pharmacy, University of British Columbia), Director of Research, Rexall Drug Co., Toronto.

Dr. Matthews has stated the scope of this seventh Canadian Formulary in the preface to the book as follows:[49]

> In determining the scope of this seventh edition of the Canadian Formulary, the Canadian Conference of Pharmaceutical Faculties recognized that certain significant trends in medical and pharmaceutical practice necessitated a re-examination of the functions of the Canadian Formulary. The compilation and publication in 1946 of the Physicians' Formulary by the Canadian Medical Association appeared to provide adequate replacement for the prescription-type formulas of Section I of the sixth edition. In 1944 the Department of Pensions and National Health, recognizing the need for further Canadian standards, and with the assistance of the Canadian Committee on Pharmacopoeial Standards, issued the Canadian Supplement to the British Pharmacopoeia. Although this was a war measure, it was understood to be the intent of the Department that these standards ultimately would be written into the Regulations under the Food and Drugs Act.* These circumstances to a large degree eliminated the need for Section II of the sixth Canadian Formulary. Consequently, it was decided that the formulas selected for inclusion should be those of a standard type which enjoy sufficient usage and that formulas of an extemporaneous type should, as a general rule, be omitted.

An interim report, prepared by the Editor[52] asked for comment, favorable or adverse, concerning proposed retentions and deletions from the previous edition. A later progress report[53] enunciated the principles which served as a guide to the committee in the selection of appropriate new preparations:

> 1. The preparation must have, or be deemed likely to achieve, reasonably wide-spread usage.
> 2. The preparation should be capable of application over a wide range of conditions.
> 3. The formula selected should produce a preparation measuring up to modern standards of pharmaceutical elegance.

**The Canada Gazette, Part II Statutory Orders and Regulations,* May 2, 1949, p. 96.

Dr. Matthews wrote, after publication of the new edition in 1949, that it might "be said to represent the beginning of a new era in the development of Canadian pharmaceutical standards. Both in format and in content the 1949 C.F. bears little resemblance to previous editions. . . . Of the one hundred and thirty-four preparations included in the new C.F., only twenty-five were in the sixth edition and several of these are substantially different in formula . . . Through the cooperation of the Board of Trustees of the United States Pharmacopoeia and the Committee on Publications of the American Pharmaceutical Association, a number of extensively used preparations from the U.S.P. and N.F. have been duplicated in the C.F. . . . The Sub-committees on Revision have striven, above all else to make this seventh C.F. useful to the pharmacist in his dispensary. Information and basic formulas are provided which can be adopted to great advantage in prescription work. . . . The Appendix section of the 1949 C.F. is an almost entirely new feature. . . . Wherever possible, the standard provided for a C.F. drug is identical with the Canadian standards as set out in the 1949 Regulations to the Food and Drugs Act."[54]

The Future of the Canadian Formulary

The last two of seven editions of the Canadian Formulary issued in the interval 1905 to 1949 differ very considerably from the first five. They differ markedly from each other also. Of course, most of the changes of format and content were dictated by rapid and extensive changes in the practice of pharmacy during that period. In the case of the last edition of the Formulary, however, some of the new formulas were designed to precede, (perhaps to cause) rather than to follow, changes in pharmacy.

Perhaps the strongest trend in prescriptions at present is away from extemporaneous compounding towards the prescribing and dispensing of previously prepared dosage forms. Often these dosage forms contain but one medicament, an indication of the increasing specificity of modern drug therapy. It is obvious, then, why the Canadian Formulary could not continue to exist in the form of the early editions. It is obvious that more changes will yet occur in the Canadian Formulary.

The purpose of modern pharmacopoeias and formularies is mainly to provide drug standards, and not to provide formulas for extemporaneous dispensing. In Canada, at present, this is accomplished by means of the Food and Drugs Act and those compendia listed in Schedule B of the Food and Drugs Act. If the Canadian Formulary is ever to become a Canadian Pharmacopoeia or a Canadian Addendum to a Commonwealth Pharmacopoeia, it would seem that interesting developments must lie in the future.

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SAFETY CLOSURE FOR MEDICINAL CONTAINERS

by Albert L. Picchioni

► ACCIDENTAL POISONING FROM DRUGS INVOLVING pre-school-aged children is a frequent occurrence. It has been stated that one-third of the deaths from poisoning result from the accidental ingestion of medicinal agents.[1] Several reports in the literature testify to the high incidence of poisoning from drugs. A publication by Cann and Associates[2] of the National Clearinghouse for Poison Control Centers reveals that 55 percent of 3926 cases of poisoning reported by 29 poisoning control centers involved ingestion of medicinal agents.

In the state of Arizona during 1959, 61 percent of 1154 cases of poisoning reported by the Arizona Poisoning Control Treatment Centers were caused by drugs. The majority of these cases involved children 1 to 5 years of age. Aspirin and other salicylates comprised 25 percent of the total number of cases, while the remainder involved "over-the-counter" and prescription drug items.

Since most of the cases of accidental poisoning from medicinal agents occur because of improper storage, administration, and disposal of these chemical agents

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A TYPE OF SAFETY CAP FOR MEDICINAL CONTAINERS

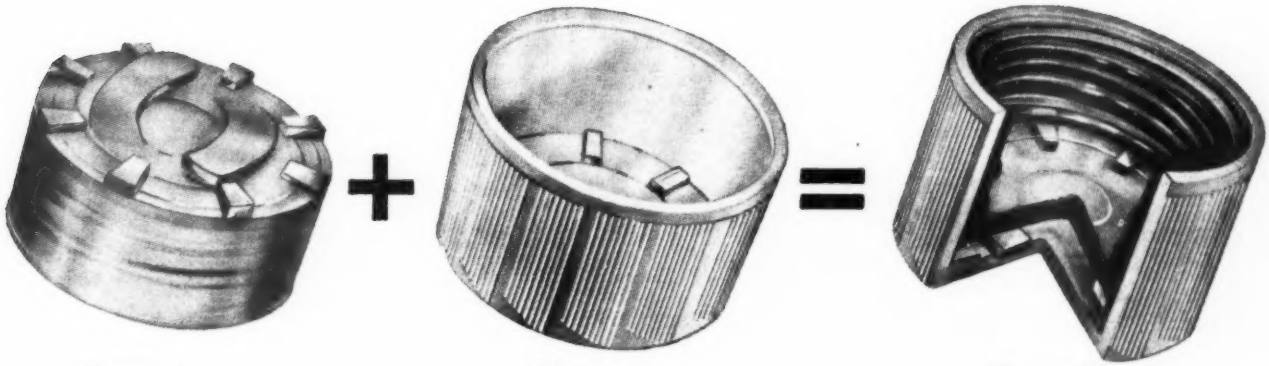


Figure 1
THE INNER CAP

Figure 2
THE OUTER SHELL

Figure 3
THE COMPLETED CAP

in the home, it is frequently emphasized that public education is the most important means for preventing these accidents. Another preventative measure which deserves more attention is the use of safety closures on containers for packaged and prescribed medications. The adoption of an effective safety closure of some type for all drug containers found in the home has been highly recommended as a measure to reduce the morbidity and mortality from accidental ingestion of potentially dangerous drugs.[1,3]

Several ingenious types of safety closures have been described in the literature[1,4] but most of these have been adapted to packaged aspirin containers. Recently, a novel safety cap designed for liquid as well as for tablet prescription containers has been made commercially available. This safety cap is constructed in 2 pieces. As shown in Fig. 1, it consists of an inner plastic (clear) cap which is threaded to seal the bottle in the conventional manner. Located in the top of this inner cap are 8 fixed plastic locking lugs and 2 elevated plastic prongs which serve as springs. A cardboard sealer disc is positioned inside of the cap which, in this respect, resembles the conventional screw cap. (Cardboard sealer is not visible in figures.)

The second part of the safety cap consists of an outer white plastic shell which fits over the inner plastic cap. Eight locking lugs are located on the inside of this shell (See Fig. 2) and are similar to the lugs found on the inner cap described above. As shown in Fig. 3, when the inner cap and the shell are assembled they appear as one ordinary cap.

When the safety cap is in place on the bottle, the outer shell is free to turn completely around the inner cap without changing the position of the latter on the bottle. To remove the cap, a downward pressure is exerted on it and in so doing the 2 plastic prongs on top of the inner cap are depressed allowing the locking lugs on both inner cap and outer shell to become engaged. As the downward pressure is applied, the cap is removed with a counter-clockwise motion in the usual manner employed when removing an ordinary screw cap (See Fig. 4). Replacement of the safety cap on the bottle involves the reversal of the above procedure, since the cap is turned in a clockwise direction on the bottle while applying a downward pressure to the cap (See Fig. 5). The directions for removing and replacing the cap are imprinted on the top of each safety cap.

The objective of the above safety closure takes into consideration the short attention span of a child. Since the white shell portion of the cap simply revolves freely when the child attempts to remove the cap,

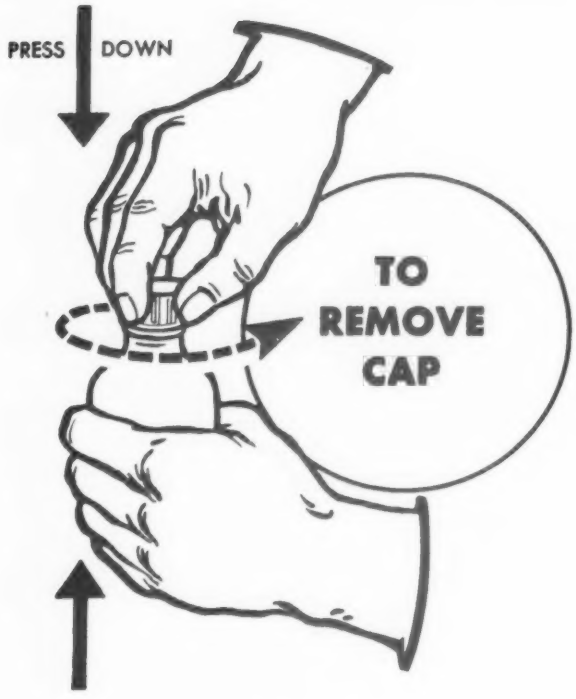


Figure 4

Figure 5

continued interest by the child for removing it usually wanes. Furthermore, most children are not capable of determining the proper combination for removing the cap, namely, that of applying a downward pressure in addition to the correct turning motion of the cap. A consumer survey involving 449 children in 4 cities in the United States has indicated that a total of 435 children could not open containers equipped with this safety closure.[5]

The safety cap described above is manufactured by the Brockway Glass Company, Brockway, Pennsylvania. At present it is available on 3 and 4 ounce clear-glass flint prescription ovals for liquid medication and on both amber and clear-glass 5 dram vials for capsules and tablets. The Brockway Glass Company plans to use the safety cap on its prescription containers of all sizes if this innovation is acceptable to the public.[5] The cost of these safety cap containers to the pharmacist is only 25-29 percent more than the conventional screw cap on the same type bottles. It would appear that the added cost of these containers would be offset immeasurably by the part that they would play in the prevention of accidental poisoning in children.

These safety cap prescription containers are available to pharmacists through the usual wholesale drug channels.

References

1. Arena, J.M.: Safety Closure Caps—Safety Measure for Prevention of Accidental Drug Poisoning in Children, *J.A.M.A., 169*:1187, 1959.

2. Cann, H.M., Neyman, D.S., and Verhulst, H.L.: Control of Accidental Poisoning—A Progress Report, *J.A.M.A. 168*:717, 1958.

3. *Bulletin of the National Clearinghouse for Poison Control Centers,* U.S. Department of Health, Education, and Welfare, Public Health Service, Washington, D.C., June, 1958.

4. Cohen, R.: Safety Attachment for Aspirin Bottles, *J.A.M.A., 171*:1102, 1959.

5. *Communication from Brockway Glass Company,* 385 Brannan St., San Francisco 7, California.

Report: Hospital Committee - American College of Apothecaries

CLARENCE R. PEARSON, *Chairman*

► SINCE THE MID YEAR MEETING in August, the work of the Hospital Committee has primarily been the implemention of the recommendations made at that time. For the benefit of those who have not seen the August report I will list those recommendations below and then report the progress which has been made.

1. It is the opinion of the Committee that the ASHP does not condone the practice of filling outpatient prescriptions; however, outpatient prescriptions are defined as those originating outside of the hospital and not for indigent patients. The chairman will write to Mr. Paul Parker concerning this subject.

Mr. Parker was contacted and the reply received was most gratifying.

I will quote from a copy of the *Guide to Application of the Minimum Standard for Pharmacies in Hospitals* that (II Policies) "Only those orders and prescriptions originating within the hospital should be filled by the hospital pharmacy. Prescriptions written by physicians who are not members of the hospital staff should not be filled by the hospital pharmacy. Regulations pertaining to the dispensing of medications to hospital personnel should be formulated and enforced." The ASHP has also emphasized its position on several other occasions including an editorial in the September-October, 1950 issue of THE BULLETIN OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS.

2. The Committee recommends that a forum discussion be held at the annual meeting of the A.C.A. similar to the one that was held at the meeting of the National Association of Boards of Pharmacy on August 17, 1960, in Cincinnati entitled, "Pharmaceutical Services in Hospitals and Nursing Homes."

It was decided to eliminate the panel discussion at this time and to work toward a joint session at the 1960 annual meeting of the ASHP. Our good Secretary, Bob Abrams, has already been in contact with Gloria Francke and the ground work for the meeting has already been completed.

3. The recommendation was made to form a joint committee with the ASHP in order to better intraprofessional relations. The Hospital Committee of the A.C.A. believes that the source of most of the bad feelings between our groups is due to misunderstanding.

We hope to form a closer relationship with the ASHP within the framework of the A.Ph.A. It is felt that this could best be accomplished with the help of Dr. William Apple.

4. The Committee recommends the correction of the resolutions concerning hospital pharmacies approved at the New Orleans meeting as follows:

a. *Resolutions No. 5.* Define outpatient.

b. *Resolution No. 6.* The American Hospital Association is not the approving agency; rather it is the Joint Commission on Accreditation. The Committee, however, would rather see the A.C.A. go on record as to offer help to these hospitals in providing pharmacy service.

The recommended changes have been submitted to the Resolutions Committee through Mr. Abrams. The corrected resolutions read as follows.

Resolution No. 5. Resolve that the American College of Apothecaries request that the American College of Hospital Administrators, the American Hospital Association and the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS petition their membership to discontinue the practice of filling prescriptions for patients who are not registered or admitted to the hospital.

Resolution No. 6. Be it resolved that the American Hospital Association, in cooperation with the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS and the American College of Apothecaries do all in their power to aid hospitals in supplying adequate pharmacy service.

5. The Committee recommends that a Fellow of the A.C.A. appear on the program of the ASHP at the 1960 convention to explain the retailers' stand on outpatient prescriptions.

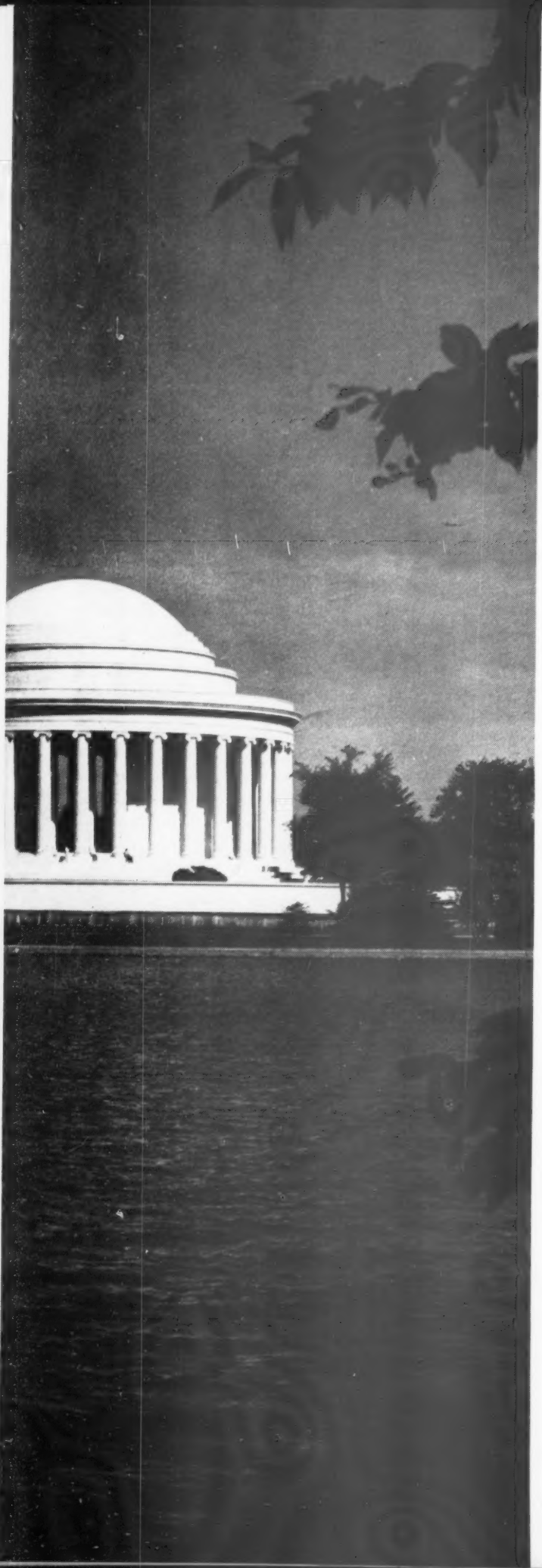
This recommendation has also been taken care of by the decision of having a joint session. Any suggestions as to subject matter will be greatly appreciated.

I would like to thank Mr. Keating and his fellow officers for the privilege of serving as Chairman of the Hospital Committee and I will do my utmost to accomplish the objectives of this Committee in the year to come.

(Report accepted with thanks on motion by Wertz-Bracken).

This report, printed with the permission of the Secretary of the American College of Apothecaries, is published for information of hospital pharmacists. The report was presented at the 19th Annual Convention of the ACA meeting in Bal Harbour, Florida, February, 1960.

NOTE: Resolution Number 5 as worded above was adopted at the 19th Annual Meeting of the ACA, February, 1960.



► PHARMACISTS REPRESENTING ALL BRANCHES of the profession will meet in Washington, D. C. during the week of August 14. With the American Pharmaceutical Association convening for its 107th annual meeting, the Association's sections and affiliated organizations will hold sessions throughout the week. In addition, special entertainment, beginning with the President's Reception on Sunday evening, August 14, and culminating with the Annual Banquet on Friday night, August 19, will offer members a relaxing and rewarding week.

Meetings will be held at the Shoreham and Sheraton Park Hotels located on the edge of Washington's famous Rock Creek Park.

ASHP Sessions

Members of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS will meet during five half-day periods arranged in accordance with the new overall schedule for A.Ph.A. events.

The ASHP Executive Committee will meet on Saturday, August 13 and the Executive Committee and Committee on Resolutions will convene on Sunday morning, August 14.

The House of Delegates and Business Sessions will be presided over by President Vernon O. Trygstad and Clifton Latiolais, Chairman of the Committee on Program and Public Relations, will present the program.

For the first time in the SOCIETY's history, the House of Delegates will meet officially for two sessions. The First Session will be held as usual on Sunday afternoon with the Second Session being scheduled for Thursday morning in conjunction with the Final Business Meeting. It is anticipated that this will offer delegates and members a better opportunity to discuss matters which may have been called to their attention at the Annual Meeting. Further, it is believed that the Address of the President-Elect will be more appropriate at the end of the meeting when he will take office.

Highlighting this year's program is a Joint Session with the American College of Apothecaries at which time leading speakers in the fields of hospital administration and therapeutics will present papers. Also, a panel discussion, moderated by ACA Secretary Robert Abrams, will offer an opportunity for discussion of mutual problems affecting hospital and community practitioners.

Special events scheduled for the ASHP meetings include the H.A.K. Whitney Award Lecture on Monday night and the traditional breakfast on Thursday morning.

The complete program for the ASHP Sessions and events is printed here for the information of the membership.

Jefferson Memorial

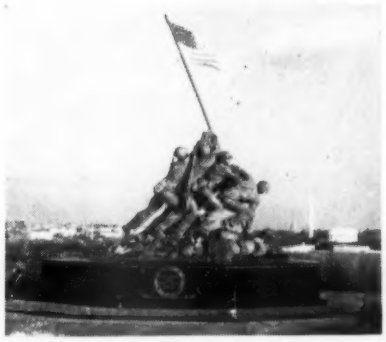
1960 ASHP ANNUAL MEETING
WASHINGTON, D.C., AUG. 14-19

ASHP EXECUTIVE COMMITTEE MEETING
Saturday, August 13, 9:30 A.M.
North Room—Shoreham

ASHP EXECUTIVE COMMITTEE
and the
ASHP COMMITTEE ON RESOLUTIONS
Sunday, August 14, 9:30 A.M.
North Room—Shoreham

ASHP HOUSE OF DELEGATES
Sunday, August 14, 2:00 P.M.
West Ballroom—Shoreham

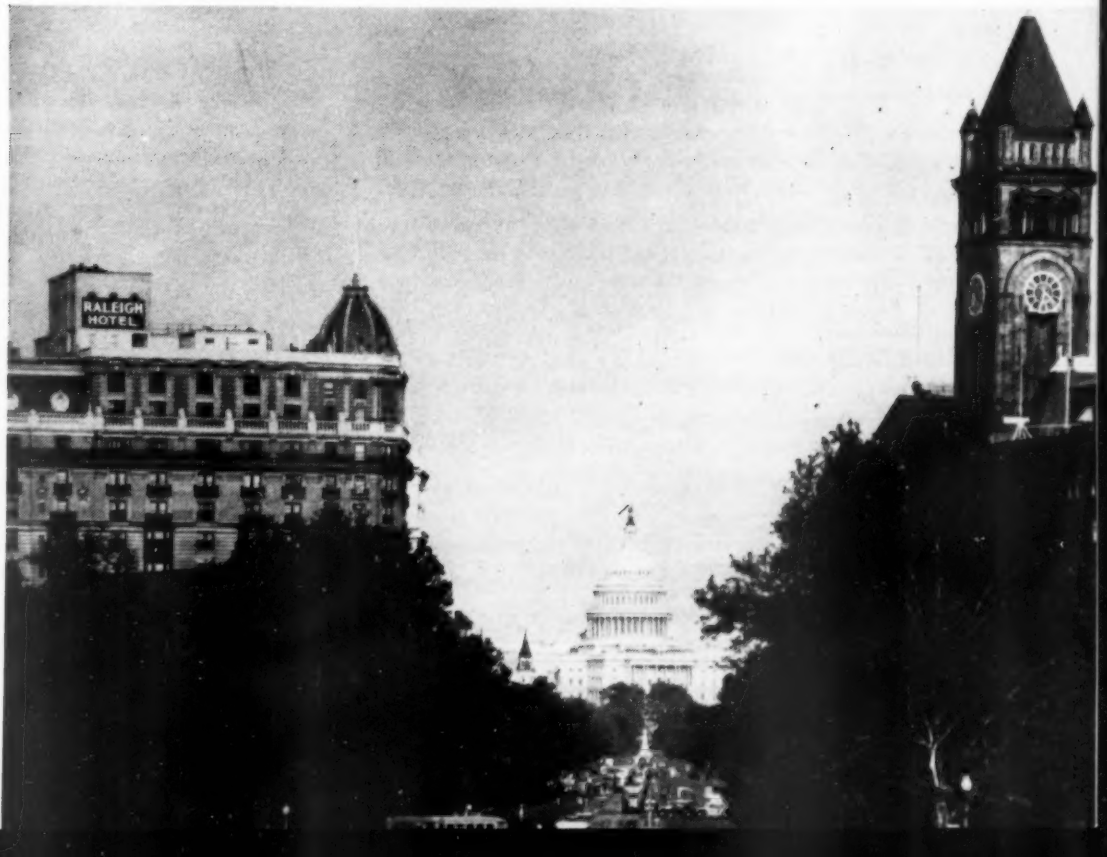
1. Call to Order.
2. Welcome to Delegates and Members, Vernon O. Trygstad.
3. Minutes of Previous Meeting.
4. Roll Call of Delegates.
5. Introduction of Local Committee.
6. Committee Appointments.
7. Preliminary Report of the Committee on Resolutions, Robert Lantos, *Chairman*.
8. Preliminary Report of the Committee on Nominations, Grover C. Bowles, *Chairman*.
9. Recommendations from Officers, Committee Chairmen and Delegates.
10. Report of the Secretary, Gloria Francke.
11. Mutual Responsibilities for Profession Survival.



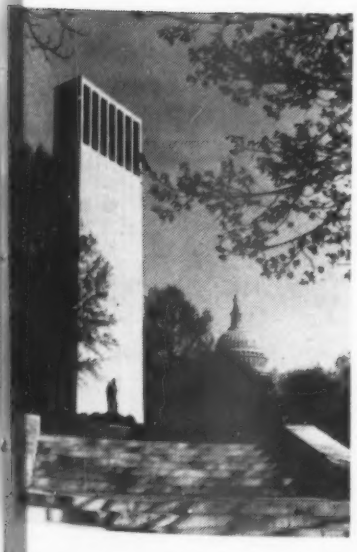
Iwo Jima Statue

Tidal Basin and Washington Monument

Pennsylvania Avenue looking toward the Capitol



Taft Memorial



12. Panel: Discussion of Preliminary Proposals of ASHP Committee on Reorganization, Walter M. Frazier, *Moderator.*
13. Panel: Discussion of Actions of Joint Committee of the American Hospital Association and the American Society of Hospital Pharmacists—Coordinated by George F. Archambault and Don E. Francke.

FIRST SESSION
Monday, August 15, 1:30 P.M.
West Ballroom—Shoreham

1. Call to Order.
2. Invocation.
3. Presentation of Awards.
4. Greetings from Allied Organizations:
   American Hospital Association
   American Pharmaceutical Association
   Catholic Hospital Association
5. Minutes of Previous Meeting.
6. Report from the House of Delegates.
7. Resolutions and Communications.
8. Appointment of Committees.
9. Introduction of Fraternal Delegates and Guests.
10. New Business.
11. Reports of Committee Chairmen.
12. Report of Treasurer, Sister Mary Berenice.
13. Report from the Division of Hospital Pharmacy, Joseph Oddis.
14. Status of the American Hospital Formulary Service—1960, William M. Heller.
15. Address of the President, Vernon O. Trygstad.

H.A.K. WHITNEY AWARD DINNER
1960 Recipient: Thomas A. Foster

LECTURE: Expanding Role of the Hospital Pharmacist as a Member of the Health Team

RECEPTION: Monday, August 15, 7:00 P.M.
West Ballroom—Shoreham

DINNER: Monday, August 15, 8:00 P.M.
Blue Room—Shoreham

SECOND SESSION
Tuesday, August 16, 9:30 A.M.
Main Ballroom—Shoreham

Joint Meeting of the
AMERICAN COLLEGE OF APOTHECARIES AND THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS

Vernon O. Trygstad, *presiding*

Social Forces Affecting Hospitals and Hospital Pharmacy, *Ray E. Brown,* Superintendent of University of Chicago Clinics, Chicago, and President-Elect, American College of Hospital Administrators.

New Therapeutic Agents and How to Evaluate Them, *Herbert S. Kupperman,* Ph.D., M.D., Associate Professor of Medicine, New York University Postgraduate Medical School, New York City.

PANEL: Trends Affecting Retail and Hospital Pharmacy Practice.

MODERATOR: Robert Abrams, Secretary, American College of Apothecaries.

PANELISTS:

AMERICAN SOCIETY OF HOSPITAL PHARMACISTS
Ray E. Brown, Chicago, Illinois
Grover C. Bowles, Memphis, Tennessee

AMERICAN COLLEGE OF APOTHECARIES
Frank Kunkel, Cincinnati, Ohio
Leonard Tibbetts, Arlington, Massachusetts

ASHP COMMITTEE ON RESOLUTIONS MEETING
Tuesday, August 16, 2:30 P.M.
North Room—Shoreham

SPECIAL SESSION
Wednesday, August 17, 10:00 A.M.
Main Ballroom—Shoreham

Hospital Pharmacy—A Live Television Broadcast from the Clinical Center, National Institutes of Health, Bethesda, Maryland.

Milton W. Skolaut, Moderator

See A.Ph.A. Program for details.

THIRD SESSION
Wednesday, August 17, 2:00 P.M.
West Ballroom—Shoreham

1. Call to Order.
2. Unfinished Business.
3. Polyvinyl Alcohol Packaging in Hospital Pharmacy, *Philip R. Hugill,* Staff Pharmacist, and *Milton W. Skolaut,* Chief, Pharmacy Department, both at the Clinical Center. National Institutes of Health, Bethesda, Maryland.
4. A Method for the Effective Application of Local Anesthetics Orally, *Sister M. Gonzales,* Chief Pharmacist, Mercy Hospital, Pittsburgh, Pennsylvania.
5. The Distribution of Drug Samples in the Hospital, *Denise M. Eno,* Instructor in Pharmacy, Duquesne University, Pittsburgh, Pennsylvania and *Glen Sperandio,* Ph.D., Associate Professor of Pharmacy, Lafayette, Indiana.
6. Legal Aspects of the Formulary System in Hospitals, *Alanson W. Willcox,* General Counsel, American Hospital Association, Washington Service Bureau, Washington, D. C.
7. Preparation of Injectables—Philosophy and Master Procedures, *Herbert Carlin,* M. S., Director of Pharmacy Service, University of Colorado Medical Center, Denver, Colorado, *Herbert L. Flack,* M.S., Director of Pharmacy Service, Jefferson Medical College Hospital and Assistant Professor, Philadelphia College of Pharmacy and Science, and *Kenneth A. Avis,* Ph.D., Associate Professor, Philadelphia College of Pharmacy and Science, Philadelphia, Pennsylvania.
8. Bulk Preparation of Coulter Counter Diluting Fluid, *G. L. Forbes,* M.D., Director of Laboratories and *Terry B. Nichols,* Chief Pharmacy Service, Georgia Baptist Hospital, Atlanta, Georgia.
9. A Comparison of Methods for Cleaning Catheters Using Iodine^{131}-Contaminated with Soil, *Donald M. Skauen,* Professor of Pharmacy, University of Connecticut, Storrs, Connecticut.

ASHP BREAKFAST
Thursday, August 18, 8:00 A.M.
Palladian Room—Shoreham

PRESIDING: Clifton J. Latiolais, President-Elect

ASHP HOUSE OF DELEGATES
Thursday, August 18, 9:30 A.M.
West Ballroom—Shoreham

1. Call to Order.
2. Unfinished Business.
3. Address of the President-Elect, *Clifton J. Latiolais.*

FOURTH (FINAL) SESSION
Thursday, August 18, 10:30 A.M.
West Ballroom—Shoreham

1. Call to Order.

2. Unfinished Business.
3. The Therapeutic Implications of Brand Interchange, *Gerhard Levy,* Pharm. D., Assistant Professor, University of Buffalo, School of Pharmacy, Buffalo, New York.
4. Electronic Data Processing System for Hospital Pharmacy, *Alexander Deeb,* Acting Director of Pharmacy, Mount Sinai Hospital, New York, New York.
5. New Business.
6. Report of Committee on Resolutions.
7. Report of Committee on Nominations.
8. Installation of Officers.
9. Adjournment.

Local Committee

A Local Committee of hospital pharmacists headed by Mr. Robert Statler, President of the Maryland Association of Hospital Pharmacists will assist with special events and serve as hosts. Other members of the Committee are Miss Mary Connelly, Pharmacist, Medical Health Center, Middle River, Md.; Miss Ursula Heyer, Chief Pharmacist, John Hopkins Hospital, Baltimore; Mr. Robert Lawson, Chief Pharmacist, University of Maryland Hospital, Baltimore; Mr. Milton Skolaut, Director, Pharmacy Service, Clinical Center, National Institutes of Health, Bethesda; and Mr. Franklin Cooper, Chief Pharmacist, George Washington University Hospital, Washington, D. C.

A Society Suite will be open throughout the week so that hospital pharmacists may meet for informal discussions.

Overall A.Ph.A. Program

Hospital pharmacists are urged to give attention to the total A.Ph.A. program which promises to cover subjects of current interest to the profession. Meetings of the A.Ph.A. House of Delegates and General Sessions are open to all members. To the extent possible, the total program has been arranged so that these meetings will not conflict with ASHP sessions and meetings of other affiliated groups.

Of particular note will be a visit to the new annex to the American Institute of Pharmacy, a joint session of A.Ph.A. section which will include discussions of pharmacy and health insurance plans and a special report on certain aspects of the Food and Drug Administration Activities.

Each section will also hold its regular individual meetings. The Scientific Section has scheduled a large number of scientific papers along with its annual business session. Sections on Pharmaceutical Economics, Practical Pharmacy, and Education and Legislation will meet jointly on Friday afternoon, August 19. The theme of the joint session will be a Town Hall meeting on the subject, "What's in a Name," which will deal with the use of generic names for prescribing and dispensing.

Complete details covering the program for the A.Ph.A., its sections, and affiliated organizations appears in the July issue of the Journal of the *American Pharmaceutical Association, Practical Pharmacy Edition.*

Registration

The registration desk will be located in the upper lobby of the Shoreham Hotel. It will be open Saturday, August 13, from 2 to 6 P.M. On Sunday, August 14, the desk will open at 10 A.M. and will register members and visitors until it closes at 6 P.M. The rest of the week from Monday through Friday the desk will be open from 8 A.M. to 6 P.M. each day.

Registration fee for members of the Association and members of their families is $15 per person. For nonmembers the registration fee is $30 per person. Applicants for membership whose applications and first year's dues are received before registration may register at the membership rate of $15 per person.

Student branch members of A.Ph.A. may register without charge, but such registration does not admit them to the annual banquet. Separate tickets for the banquet may be purchased for $10. Wives and guests of student branch members may register at the regular active membership fee of $15 which includes the banquet.

All of the meetings of A.Ph.A., its sections and affiliated and related groups will be held at the Shoreham or Sheraton Park Hotels and special shuttle bus service between the hotels will be provided for the convenience of members. Air conditioned buses and hotel rooms will make the session and tours comfortable and pleasant at what promises to be a record-breaking, history-making A.Ph.A. convention.

Women's Entertainment

Our country's enchanting capital and the surrounding territory will be well traveled by the ladies at A.Ph.A.'s convention. Tours which will take them through many of the public buildings and to national shrines have been planned. On Monday afternoon the ladies will tour the Capitol, the Smithsonian Institution, the National Gallery of Art, Library of Congress and Bureau of Printing and Engraving.

Scheduled for Tuesday afternoon is a tour of Mount Vernon which will include stops at Jefferson Memorial, Tombs of the Unknowns, Arlington Memorial Amphitheatre and Christ Church in Alexandria. A tour of three embassies will occupy the ladies on Wednesday afternoon while a luncheon and fashion show will highlight the Thursday program.

Two tours have been scheduled for Friday along with the banquet in the evening. On Friday morning the group on a Monastery Shrine tour will visit the Franciscan Monastery, Shrine of the Immaculate Conception, Islamic Mosque and Washington Cathedral. Friday afternoon there will be a repeat of the public building tour.

as the president sees it—

VERNON O. TRYGSTAD, *Veterans Administration, Washington, D. C.*

► WASHINGTON IS HUMMING these days with preparations for the A.Ph.A. convention and the Annual Meeting of the ASHP. An outstanding event in any year, it should be exceptional this year with its setting in the Nation's Capitol. General Chairman Tom Foster started long ago to hold meetings with many who will be concerned with the numerous and varied activities. (This will be a banner year for Tom, as Convention General Chairman, as the highly deserving recipient of the Whitney Award, and in completing his final year of a long, illustrious career of service to his government in the Public Health Service and OCDM.)

Dr. Apple, George Griffenhagen and others on the A.Ph.A. staff, Mrs. Paul Briggs, Chairman of the Ladies' Activities Committee, Bob Statler, President of the Maryland Association of Hospital Pharmacists and committee members from that group who will serve as local hosts to the ASHP, and many others are busy making preparations that give positive assurance of an outstanding convention.

ASHP PROGRAM

President-Elect Cliff Latiolais, this year's Program Chairman, and his Committee have worked long and hard to develop an excellent program for the Annual Meeting. Secretary Gloria Francke has been putting in her usual "more than full time" on necessary details and arrangements. Joe Oddis, Director of the Division of Hospital Pharmacy and Assistant Secretary of the ASHP, enroute from Chicago to assume his new position at this writing, will have received a fast indoctrination and will be applying his master's touch to final preparations as you read this.

I will not attempt to give a preview of the entire program. It has been published and I know you will recognize many items of outstanding interest to all hospital pharmacists. One highlight, for example, will be a joint meeting of the ASHP and the American College of Apothecaries, with a panel discussion by representatives of both groups. In view of recent controversial matters concerning hospital and retail pharmacy practice, you won't want to miss it. Walter Frazier's report of his committee's study on organization of the SOCIETY should be of interest to every member. You will also hear a report of the Joint Committee of the ASHP and American Hospital Association which has again done some outstanding work, and will have recommendations of real importance to hospital pharmacy and hospital administration. In the realm of service to all hospitals and hospital patients, don't miss Dave Anderson's report of the work of his Safety Practices and Procedures Committee and its activities with the National League for Nursing. These are only a few of the highlights. Look up the complete program and list of committees to be reporting, and easily convince yourself that you can't afford to be anywhere but in Washington at the Annual Meeting the week of August 14-17.

PHARMACY IN ZAGREB

Most pharmacists who receive the AMERICAN JOURNAL OF HOSPITAL PHARMACY probably read it and file it or have it bound as a permanent library copy. Whether you do or not, I recommend that you save and especially mark Don Francke's editorial in the May 1960 issue entitled "American Pharmacy in Zagreb." In it, he deplores the exhibiting of supermarket-type drug stores at European fairs, represented as "typical American drug stores." Let us not mistake the taking to task of the type of business Dr. Francke refers to in his editorial as any denial of a pharmacist's right to practice in such a drug store, or for that matter, to own and operate one if he so chooses. No one denies a drug store chain's right to exhibit their drug store in other countries if they want to. To be invited to do so is and should be considered an honor. But Dr. Francke's editorial pointedly raises a question—is this good for American pharmacy or the public's view of it? Especially in countries where professional pharmacists have not become calloused as we have to the good-natured jibes at the restaurant and general merchandise settings in which a part of American pharmacy is practiced. Of course we know that this is intended to demonstrate a trend in modern retail merchandising. But from a pharmacist's view, what is the point? To show our European neighbors, once again, what a vast variety of consumer goods we are fortunate enough to have? Or what skillful merchan-

disers our super-drug store operators are? Surely there must be a way of demonstrating these well known facts other than by representing them as American Pharmacy.

It is good news that the American Pharmaceutical Association, working closely with the Office of International Trade Fairs, has been instrumental in arranging for an additional exhibit at the Zagreb fair which will depict the more professional side of pharmacy and its development in this country. It is hoped that this may be the tone of future pharmacy exhibits at International Trade Fairs.

There are other pointed comments in Dr. Francke's sound, hard hitting, "the truth hurts" editorial. It doesn't make pleasant reading. It's no bromide or tranquilizer. But it strikes hard at one of the facts of pharmacy to which those most concerned with pharmacy's public image should give serious attention. It is good to know that the A.Ph.A. has taken the first step.

Vernon Tryggstad

First Specialized Institute on Hospital Pharmacy

► THE FIRST SPECIALIZED INSTITUTE ON Hospital Pharmacy will be presented at the American Hospital Association Headquarters Building, Chicago, Illinois, on October 12-14, 1960. Following the traditional pattern established for holding general institutes, the Specialized Institute will be conducted by the AHA in cooperation with the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS and the American Pharmaceutical Association.

This being the first institute of this type to be held for hospital pharmacists by the participating organizations, the central theme of "hospital pharmacy administration" was selected for study in depth. Although problems of organizational communication will serve as the focus for the general theme of hospital pharmacy administration, it is anticipated that such factors as organization and administration, supervision, planning and scheduling, problem solving, etc. will be included in the three day session.

This institute is designed to help pharmacists with administrative responsibilities deal more effectively with communication difficulties by providing:

—knowledge of relevant theories of the communication process;

—understanding of both the interpersonal dimension and the role of organizational structure in modifying the adequacy of communication; and

—insight into the skills which people in organizations need to develop to carry out their professional and administrative roles most effectively.

The design of the institute utilizes *demonstrations, role playing, and small group discussion,* providing opportunity for the widest participation possible with a large group.

There will be some theory sessions, but the majority of the sessions will demand more active participation than is customary in the general institutes provided for hospital pharmacists.

Dr. Harry Miller of the Center for the Study of Liberal Education for Adults, Chicago, Illinois, has been engaged as a consultant in the planning and conduct of the institute. Assisted by a selected group of experts, he will assume a major role in relating administrative processes to hospital pharmacy departments.

Those wishing to attend must be hospital pharmacists. In addition, qualification for attendance must be determined by each prospective applicant after carefully reviewing the announced program. In arriving at a decision, each individual should consider such factors as a) attendance at previous general institutes, b) length of experience and previous positions held, and c) current position.

During the next few weeks application blanks will be mailed to all hospital pharmacists who are members of the ASHP. Registration will be necessarily limited to 100 and applications will be processed in order of receipt.

Living accommodations will be available at the Lake Tower Motel, 600 North Lake Shore Drive, Chicago, Illinois, which is approximately four blocks from the AHA Headquarters Building. Room reservation blanks will be sent with the notice of acceptance to the institute.

The institute has been carefully planned following considerable thought and discussion by the Program and Public Relations Committee of the SOCIETY and review by the Executive Committee. The theme chosen was given similar serious thought and was considered to be an appropriate one for the first specialized institute. The total program should fill a real need for hospital pharmacists, particularly those absorbed with administrative responsibilities.

Therapeutic Trends

edited by WILLIAM JOHNSON

Benzphetamine In Management Of Obesity

Semkin and Wallace in *Current Therapeutic Research* 2:33 (Feb.) 1960 report that a new anorexic agent, benzphetamine, was evaluated in 54 patients by means of a double-blind study. The overall loss of weight achieved by patients taking the active medication was significantly greater than that achieved by patients on placebo medication. Patients receiving either 25 or 50 mg. of benzphetamine three times daily before meals exhibited a persistent significant loss of weight throughout the twenty week duration of this study, whereas placebo patients showed a negligible weight loss after the first four weeks of the study. The incidence and quality of side effects due to the medication reported by the patients in this study were the same for the drug-treated and placebo groups, with the exception that there was a definitely greater incidence of hunger in the placebo patients. This may be interpreted as meaning that most of the side effects elicited in this study were in reality the symptoms of obese patients undergoing semi-starvation on low calorie diets. Benzphetamine or N-benzyl-N, *alpha*-dimethylphenethylamine hydrochloride was synthesized in the laboratories of the Upjohn Company under the trade name Didrex.

SYLVIA SCHMIDT

Aminophenylpyridone—Emotional Stabilizer

Aminophenylpyridone produced a definite stabilizing effect in psychoneuroses, 88 percent of patients reporting relief in 92 trials. Relief was evidenced by a lessening or abolition of agitation, anxieties, tensions, apprehensions, excitability, hyperactivity, and other exaggerated responses to situational factors. The incidence of complaints was negligible as reported by A. Cantelmo in *Current Therapeutic Research* 2:72 (Feb.) 1960. Results of studies on blood, urine, and vital functions were in all cases, within the normal range. Aminophenylpyridone was supplied by Maltbie Laboratories as Dornwal.

SYLVIA SCHMIDT

An Effective Mydriatic

Ro 1-7683, a new mydratic, is claimed to have overcome the disadvantages of prolonged time needed for dilation of the eye and also the prolonged time required for the eye to return to normal. Nano *et al.* studied the effects of Ro 1-7683/15 and reported their findings in *Am. J. Ophth.* 49:958 (May) 1960. The drug, manufactured by Hoffmann-LaRoche Company, was found to have several distinct advantages. It is effective for both diagnostic purpose and as a cycloplegic in the performance of refraction. It is quick acting and a good view of the fundus is obtained 10-15 minutes after instillation. The action is stronger than other commonly used agents. Usually, with Ro 1-7683 the pupil returns to normal within eight to nine hours as compared to standard mydriatics which require about 24 hours. In eyes with pathologic fundi, Ro 1-7683 produces dilation sufficient to permit inspection with a standard ophthalmoscope in seven to ten minutes. Ro 1-7683 does not elevate intraocular pressure in preglaucoma. Ro 1-7683 is also a useful agent in the operation for cataract. Although no tension was noted it was felt well to protect glaucomatus patients with Diamox. The drug appears to be a valuable addition to the field of mydriatics.

RICHARD H. HARRISON

Sulphasomizole—A New Antibacterial Sulfonamide

Sulphasomizole, a new antibacterial sulfonamide, was reported by A. Adams *et al.*, in *Nature* 186:221 (Apr. 16) 1960. This drug represents a new departure in sulfonamide research by utilizing a hitherto unknown heterocyclic nucleus, the isothiazole nucleus. The chemical name for this new compound it 5-p-aminobenzenesulphonamido-3-methylisothiazole. This compound can be synthesized by two different methods, both reported in this paper. The research stemmed from study of the similarity between the -S- and -CH=CH- groups in aromatic structures. The sodium salt is highly water-soluble and is well suited for injection but the acetyl salt is relatively insoluble. Listed in this report were numerous organisms, both gram-negative and gram-positive, against which this new compound showed high activity. There were some bacteria to which this drug was ineffective; however, the reference sulfonamides also showed no activity against these organisms. The results of studies determining blood levels, cerebrospinal fluid levels, distribution in the tissues and excre-

tion in the urine are given. These studies were performed on several species of animals and some studies were done on a few humans. Clinical studies with this compound are now in progress. The animal studies indicate this compound does not produce crystalluria even in high dosages. Due to the results of this study, further research is indicated for this compound and the isothiazole nucleus derivatives.

DALE R. HYDER

Treatment Of Asthma With Chlortropbenzyl

A new drug, chlortropbenzyl, combines in its structure the tropine nucleus for antispasmodic effort and the benzhydryl nucleus for the antihistamine action. Chlorination on the benzhydryl ring apparently potentiates and prolongs the action of the drug. Fromer studied the action of the drug and reported his findings in *Annals of Allergy 18*:259 (Mar.) 1960. A series of thirty patients were treated in the trial. Dosage ranged from 2.5 mg. to 10 mg. daily. The usual dosage was one 5 mg. tablet one hour before bedtime and during the trial all other drugs were discontinued except for some vitamins. Side effects were minimal. All the patients showed some improvement. While the drug was found to be ineffective in alleviating the acute attack it prevented further attacks. Some patients noticed a tranquilizing effect and the children had a weight gain at a higher rate than ever before. It is felt that chlortropbenzyl is a valuable adjunct in the treatment of asthma. The drug was supplied by Wyeth Laboratories as Wy 2149 and Schenley Laboratories as FC-1.

RICHARD H. HARRISON

Colistin Salts For Diarrhea

Fifty infants with acute, severe diarrhea were treated with colistin, a complex polypeptide having a molecular weight of about 1200. Twenty-four patients received oral colistin sulfate, and 26 received both oral colistin sulfate and intramuscular sodium colistinmethanesulfonate. The dose of the oral preparation was 5 mg. base/Kg./day and the intramuscular form was 1.66 mg. base/Kg./day. Seventy percent of the infants had excellent or very good results, 18 percent satisfactory results, and 12 percent were failure cases. The failure cases were gravely ill children, two of whom died within hours after admission to the hospital and four of whom also failed on other treatments. Stool cultures of these cases generally showed heavy growth of *Aerobacter aerogenes, Pseudomonas aeruginosa,* and organisms of the coliform intermediate group. In addition to being an effective agent in acute, severe diarrhea, colistin has the advantages of atoxicity, stability, effectiveness in low dosage, and effectiveness by either oral or intramuscular routes. Colistin salts can be stored indefinitely without loss of potency and do not require refrigeration. M. Hoekenga *et al.,* in *Antibiot. Med. Clin. Therap. 7*:314 (May) 1960, point out that it is effective in various other conditions, unlike many other diarrhea medications, and seemed to cause improvement in bronchitis and other complication illnesses in the present study. Colistin sulfate was supplied as Coly-Mycin S and sodium colistinmethanesulfonate as Coly-Mycin M by Warner Chilcott Laboratories.

SYLVIA SCHMIDT

Local Anesthetic With Anticoagulant Properties

Edward Mandel, in *A.M.A. Arch. Dermatol. 81: 318/260* (Feb.) 1960, claims that this is the first report of chloroquine dihydrochloride being used as a local anesthetic and anticoagulant. Chloroquine is chemically unrelated to Novocain or Xylocaine and, when injected intradermally or subcutaneously, produces prompt local anesthesia adequate for the performance of dermatological surgery. It was also noted that prolonged bleeding occurs at the sites of injections and scalpel surgery. In a series of 31 unselected patients, the local anesthetic effect proved adequate for the performance of dermatological surgery. No systemic or local toxicity has been observed except that prolonged bleeding, unaltered by the presence of epinephrine, appeared at the sites of scalpel surgery. In an *in vitro* study of four additional patients, significant anticoagulant activity occurred only when the concentration of chloroquine dihydrochloride reached 12.5 mg. per ml. of blood. Concentrations of chloroquine dihydrochloride of 25 or 50 mg. per ml. of blood prevented clot formation for nine plus hours. Aralen is the trade name of chloroquine produced by Winthrop Laboratories.

SYLVIA SCHMIDT

Evacuation Of The Colon With Bisacodyl

Use of bisacodyl (Dulcolax) preparation in 500 consecutive cases of barium enema examination and in 125 cases of intravenous pyelography has proved that it can favorably replace use of castor oil and enemas. The elimination of unpleasant taste, the simplicity of administration, the high quality of results obtained, and the considerable saving of work and time for the hospital personnel are the advantages in the use of bisacodyl. All liquids usually existing after enema are eliminated and the gases found in the bowel are considerably reduced by this drug. This report by Raymond *et al.* appeared in *J. Canad. Med. Assoc. 82*:1077 (May 21) 1960.

KENNETH W. HUCKENDUBLER

Timely Drugs

Chymoral

COMPOSITION: Purified concentrate with specific trypsin and chymotrypsin activity in ratio of approximately 6:1.
INDICATIONS: Anti-inflammatory enzyme tablet where inflammation, swelling and pain are present. Speeds reduction and absorption of hematoma and edema in trauma, is useful as adjunct to conventional measures in inflammatory dermatoses, aids in liquefying tenacious mucous secretions in asthma, bronchitis, etc.
DOSAGE: Two tablets 4 times daily initially; one tablet 4 times a day for maintenance.
PREPARATIONS: Tablets providing enzymatic activity equivalent to 50,000 Armour units.
PACKAGING: Bottles of 48 tablets.
SUPPLIER: Armour Pharmaceutical Co.

Medrol Medules

GENERIC NAME: Methylprednisolone.
INDICATIONS: Same as Medrol, i.e. rheumatoid arthritis, disseminated lupus erythematosus, and allergic diseases; however, Medules provide action over an extended period of time.
SIDE EFFECTS AND CONTRAINDICATIONS: Should be used with caution in presence of active tuberculosis, diabetes mellitus, osteoporosis, chronic psychoses, predisposition to thrombophlebitis, congestive heart failure, hypertension, renal insufficiency, and intercurrent infection.
DOSAGE: Rheumatoid arthritis, initially 6 to 16 mg. daily, with maintenance of 2 to 12 mg. Disseminated lupus erythematosus, initially 20 to 96 mg. daily, with maintenance of 8 to 20 mg. Allergic diseases range initially from 8 to 40 mg., with maintenance of 4 to 16 mg.
PREPARATIONS: Sustained action capsule containing 4 mg. methylprednisolone.
PACKAGING: Bottles of 30 and 100 capsules.
SUPPLIER: Upjohn Co.

MER/29

GENERIC NAME: Triparanol.
INDICATIONS: Directly inhibits cholesterol biosynthesis in liver and other tissues, thus of value for patients with hypercholesterolemia and conditions thought to be associated with abnormal cholesterol metabolism.
SIDE EFFECTS AND CONTRAINDICATIONS: Should not be administered during pregnancy; excretion of MER/29 or its metabolites may produce a false positive reaction for albuminuria.
DOSAGE: 0.25 Gm. daily before breakfast.
PREPRATIONS: Capsules containing 0.25 Gm. triparanol.
PACKAGING: Bottles of 30 capsules.
SUPPLIER: Wm. S. Merrell Co.

Neo-Medrol Eye-Ear Ointment and Drops

COMPOSITION: Methylprednisolone and neomycin sulfate.
INDICATIONS: Ophthalmic—marginal ulceration, phlyctenular keratoconjunctivitis, nonspecific superficial keratitis, herpes zoster ophthalmicus, etc. Otologic—seborrheic dermatitis, contact dermatitis, and infected eczematoid dermatitis.
SIDE EFFECTS AND CONTRAINDICATIONS: Contraindicated in presence of tuberculosis infections of the eye and herpes simplex keratitis (dendritic keratitis).
DOSAGE: Ophthalmic—one or two drops in conjunctival sac every hour (or every two hours at night if ointment is used); ointment may be placed in conjunctival sac 3 or 4 times daily. Otologic—two or three drops in external ear canal 2 or 3 times daily; ointment may be used by filling the external ear canal one to three times daily.
PREPARATIONS: Ointment or drops containing in each Gm. or ml., respectively, methylprednisolone 1 mg. (0.1%) and neomycin sulfate 5 mg. (equivalent to 3.5 mg. neomycin base).
PACKAGING: Drops, bottles of 5 ml.; ointment, tubes of ⅛ ounce.
SUPPLIER: Upjohn Co.

Tacaryl

GENERIC AND CHEMICAL NAMES: Methdilazine hydrochloride; 10 (1-methyl-3-pyrrolidyl methyl) phenothiazine hydrochloride.
INDICATIONS: In management of allergic conditions such as nasal allergies, allergic conjunctivitis and bronchitis, urticaria, and angioneurotic edema.
SIDE EFFECTS AND CONTRAINDICATIONS: Should be used with caution in patients receiving alcohol, analgesics or sedatives.
DOSAGE: Adults, 8 mg. twice daily; children, 4 mg. twice daily.
PREPARATIONS: Syrup containing 4 mg. per 5 ml. and tablets containing 8 mg. methdilazine hydrochloride.
PACKAGING: Syrup, bottles of 16 ounces; tablets, bottles of 100.
SUPPLIER: Mead Johnson.

TA-TEST

COMPOSITION: A latex-fixation rapid slide testing procedure.
INDICATIONS: For diagnosis of thyroid diseases; detects presence of precipitin antibody associated with Hashimoto's disease (chronic lymphoid thyroiditis) and primary myxedema; is particularly useful in differentiating these conditions.
PROCEDURE: Patient's inactivated serum is mixed with Latex Thyroglobulin Reagent on glass slide and observed for clumping.
PACKAGING: Twenty-test kit containing Latex-Thyroglobulin Reagent, Positive Control Serum, Glycine-Saline Buffer Diluent, and a divided glass slide.
SUPPLIER: Hyland Laboratories.

Thrombolysin

GENERIC NAME: Fibrinolysin, human; activated profibrinolysin.
INDICATIONS: Thrombophlebitis, phlebothrombosis, pulmonary embolism, and certain arterial thrombi.
SIDE EFFECTS AND CONTRAINDICATIONS: Contraindicated in presence of hemorrhagic diathesis or hypofibrinogenemia. Use with caution immediately after operation or anesthesia.
DOSAGE: 200,000 (MSD) units daily by intravenous infusion; dosage range is from 50,000 (MSD) units to 100,000 (MSD) units an hour for 1 to 6 hours.
PREPARATIONS: Vials containing 50,000 (MSD) units.
PACKAGING: Vials of 100 ml.
SUPPLIER: Merck Sharp & Dohme.

Consulting WITH BOWLES

GROVER C. BOWLES JR., *Baptist Memorial Hospital, Memphis, Tennessee*

► Where can one find reliable information on the use and control of investigational drugs?

Reprints of the excellent group of articles on the use and control of investigational drugs in hospitals which appeared in *Hospitals,* January 1, 1958 are available from the American Hospital Association, 840 North Lake Shore Drive, Chicago 11, Ill. You may also want to review the A.H.A. policy statement on "Principals Involved in the Use of Investigational Drugs in Hospitals" which was originally published in *Hospitals,* December 1, 1957.

► Isn't it possible for the ASHP to develop a hospital pharmacy procedural manual? It would seem that such a manual would be of great value to hospital pharmacists and would lead to more uniform practices throughout the country.

The development of a pharmacy procedural manual is one of the long range projects of the Joint Committee of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS and the American Hospital Association. While work has begun, it will be several months—perhaps longer, before the manual will be available.

A number of hospital pharmacists have developed their own procedural manuals. This is highly desirable and is the mark of a well managed department. For information about preparing procedural manuals see the June 1959, AMERICAN JOURNAL OF HOSPITAL PHARMACY. In this issue you will find:

Procedural Manuals as Administrative Fools—Don E. Francke

Operational Manuals in Hospital Pharmacy—Sister Mary Berenice

Mercy Hospital Pharmacy Policies—Sister Mary Vera Rourke

You will also find these two articles helpful: Preparation and Use of a Pharmacy Manual, M. R. Kneifl, THE BULLETIN, July-August 1957; and The Value of Procedural Manuals for Hospital Pharmacies, G. F. Archambault, THE BULLETIN, January-February 1955.

► We are frequently asked for information about the dosage of antibiotics and other potent drugs to be used in laboratory animals. What is the basis for determining animal doses? Can you suggest a good reference book that would be helpful in supplying this type of information?

For the most part, the same drugs used in humans are used in animals and they are administered by the same routes. Pharmaceutically, the same care should be exercised in compounding and dispensing drugs for animal use that would be exercised in preparing drugs for human use.

The size of the animal is the chief factor in the determination of veterinary doses. However, dosage may also be influenced by species, age, idiosyncrasy, time of administration, and route of administration.

You will find *The Merck Veterinary Manual,* available from Merck & Co., Inc., Rahway, New Jersey, a convenient reference for use in the pharmacy and by hospital personnel concerned with the care of laboratory animals.

► When chlorobutanol is used as a preservative in parenteral and ophthalmic preparations, what is the concentration used and how do you get it into solution?

Chlorobutanol in a concentration of 0.33 percent anhydrous (0.35 percent hydrous) is an effective bacterostatic agent for use in small volume parenteral solutions and certain ophthalmic preparations. Some precipitation with age may occur when higher concentrations are used. Anhydrous chlorobutanol should be used and it should be purchased in small containers.

Solution is accomplished by heating the water or other vehicle to about 50° C., remove from heat, add the chlorobutanol and stir or shake at frequent intervals until it is dissolved. Avoid loss of chlorobutanol by sublimation.

► What criteria should be used in determining the drugs to be stocked at the nursing station for which no charge to the patient is made?

Ordinarily, frequency of use and cost are the primary factors in determining which drugs will be stocked at the nursing station and furnished without cost to patients. The stock drug list should be kept current and the pharmacist should seek the advice and help of the nursing service and the Pharmacy and Therapeutics Committee in making revisions. Revisions should conform to hospital policy and administrative approval should be obtained when major changes in the stock drug list are made.

► Will you please send us the names and addresses of companies supplying suppository molds?

Information about suppository molds may be obtained from: A. Cavalla, Inc., 163 West 18th St. New York 11, New York, and Progressive Machine Works, Inc., 137 West 22nd Street, New York 11, New York.

CONTROL OF POISONINGS

edited by **ALBERT L. PICCHIONI,** *Director, Arizona Poisoning Control Program*

Philodendron Dermatitis

► SOME SPECIES OF THE POPULAR HOUSE PLANT, Philodendron, have been found to cause skin eruptions according to a recent article in A.M.A. *Archives of Dermatology.*[1] Twelve cases of erythemato-vesicular rash, resembling poison ivy or poison oak of the hands and arms were patch-traced to *Philodendron cordatum* (heart shaped) and several related species of the family *Araceae.*

A five-year mystery was solved when the itchy fingers of a seed company's secretary were found to have tended the office vines. In another case, a building inspector's rashes were traced to the current Philodendron vogue in office buildings.

Poisoning Involving Alkyl Quaternary Ammonium Compound

A Tucson physician has reported to the Arizona Poisoning Control Information Center a case of accidental poisoning involving the germicide, "Double S Saniside." The active constituent of this preparation is N-alkyl-(C_{14},C_{12},C_{16}) dimethyl benzyl ammonium chloride, a quaternary ammonium compound, present in the above product in a concentration of 10 percent. It is known that concentrated solutions of a quaternary ammonium detergent are strongly irritant to the mucous membranes as well as to the skin.[2]

A young male adult accidentally took into his mouth about 30 ml. of the "Double S Saniside" disinfectant, but rapidly ejected the substance. Three hours later he reported to the physician after experiencing respiratory difficulty. The physician found that the victim was suffering from a severe laryngeal edema. Upon admission to the hospital, Solu-Cortef, 100 mg. was administered intravenously. Additional 50 mg. doses of this corticosteroid were administered 1½ hrs., 3 hrs., 6 hrs., and 10 hrs. after the initial dose. Cortisone suspension, 50 mg. was administered intramuscularly every 6 hrs. during the first day, every 8 hrs. during the second and third days and every 12 hrs. during the fourth and fifth days.

The result of this therapy was excellent. Ninety percent of the laryngeal edema had disappeared within 12 hours after institution of corticosteriod therapy. It is thought that tracheotomy was avoided as a result of the effectiveness of this drug therapy.

Poison-Antidote Cart

A moveable, locked, poison-antidote cart designed to contain all the necessary therapeutic agents to handle accidental poisoning cases in the hospital emergency room has recently been described by Bidder and Sunshine.[3] The authors claim that the availability of this cart permits emergency situations to be handled with promptness and dispatch, since all the drugs and equipment for the symptomatic treatment of poisoning emergencies are assembled and readily available. The cart also maintains reference toxicological textbooks. A mobile poison-antidote cart such as the one described by Bidder and Sunshine is now commercially available.

Acute Glutethimide (Doriden) Poisoning

Glutethimide (Doriden) has received wide clinical use as a bed-time sedative and hypnotic. Widespread use of this drug has been accompained by an increasing number of poisoning incidents involving this agent—both accidental and intentional. The Arizona Poisoning Control Information Center has received at least 15 reports of glutethimide poisoning from the Arizona Hospital Treatment Centers during 1958.

A currently acceptable therapeutic philosophy for acute glutethimide intoxication based on considerable experience has been made available,[4] and it is presented here to supplement the Doriden information card located in each of the Arizona Hospital Poisoning Control Treatment Center's files.

(a). Mild cases of glutethimide poisoning will have a normal blood pressure, deep tendon reflexes, and can be aroused by painful stimuli. The blood level will probably be in the range of 0.5 to 1.0 mg./100 ml.* Such patients can be treated with symptomatic therapy and patience. They will awaken after a period of prolonged sleep.

(b). Moderate cases may manifest hypotension, shallow or abdominal breathing, absent or variable deep reflexes, and some plantar withdrawal. Pain response and corneal reflex should be present. The blood level will probably range from 1 to 3 mg./100 ml.* Treatment should include early lavage of the stomach, but the physician should desist immediately if apnea or respiratory irregularity occurs. The use of endotracheal suction and oxygen and pressor drugs for hypotension

*See footnote on next page.

are valuable—care is necessary to avoid overhydration. Cerebral edema represents a major threat. One may titrate the patient with bemegride (Megimide) using 50 mg. increments every 10 to 15 minutes and maintenance doses as needed to keep a "safe" state of anesthesia. It is well to be suspicious if more than 1500 mg. of bemegride is required to lighten anesthesia. The bemegride should be stopped immediately if clonus or convulsions are produced.

(c). Severe cases will show hypotension, arcflexia, deep coma, absent plantar withdrawal, and pain response. The blood level will probably be above 3.0 mg./100 ml.* Such patients should be titrated with bemegride immediately after taking a blood sample for determination of the glutethimide level. Other measures are instituted as one is able. Plans should be made for external hemodialysis with an artificial kidney on an emergency basis in the event of the following: (a) failure to elicit light reflex or plantar withdrawal, (b) a bemegride requirement greater than 1500 mg. on titration, (c) convulsions from bemegride, (d) later deterioration of clinical state.

Treatment of Poisonous Snakes

It is of interest to note that a revised instruction circular for the treatment of pit viper venom poisoning is now supplied with each package of Antivenin (Crotalidae) Polyvalent. (North and South American antisnakebite serum). The use of the antivenin remains essentially unchanged, but all reference to the use of incisions at the site of the fang punctures and areas of swelling, and application of suction has been deleted from the new instructions. In a recent report in the literature[5], the author states "the instructions for treatment of snake envenomation included in the antivenin package as now supplied have been revised to conform to present clinical thinking and have been officially approved. Neutralization of the venom with antivenin in adequate dosage is the only measure recommended." The report also points out that the direction circular contains a condensed account of the evidence on the basis of which chilling, by chemical or other means, is interdicted as a form of treatment.

*Identification and quantitative determination of serum glutethimide can be carried out according to the method of Goldbaum, L. R. *et al* as reported in *Fed. Proc., 16*:300 (1957). Details of this procedure are available at the Arizona Poisoning Control Information Center.

References

1. Ayres, S., Jr. and Ayres, S. III: *A.M.A. Arch. Dermat., 78*:330, 1958.
2. Gleason, M. N., Gosselin, R. E., and Hodge, H. C., *Clinical Toxicology of Commercial Products*, p. 171, The Williams and Wilkins Co., Baltimore, 1957.
3. Bidder, T. G. and Sunshine, R.: *J.A.M.A., 168*:514, 1958.
4. Schreiner, G. E., Berman, E. G., Kovach, R., and Bloomer, H. A.: *A.M.A. Arch. Int. Med., 101*:899, 1958.
5. Buckley, E.: *J.A.M.A., 169*:96, 1959.

Exchange Transfusion in Acute Poisoning

► AN ARIZONA PHYSICIAN HAS REPORTED to the Arizona Poisoning Control Information Center the application of exchange transfusion in the treatment of accidental poisoning involving an anti-nauseant medication in a 22-month old child. The child ingested 10 tablets of the preparation, each tablet of which contained the following ingredients:

Buclazine HCl	50 mg.
Scopolamine HBr	0.2 mg.
Atropine Sulfate	0.05 mg.
Hyoscyamine	0.05 mg.

One and one-half hours after the drug was ingested, the mother of the child reported the incident to the physician. At that time the child was displaying signs of hyperexcitability, although no generalized convulsions were observed. The child also showed signs of choking at times, probably due to xerostomia produced by the cholinergic blocking agents. The child also revealed a dry, flushed face and widely dilated pupils, non-reactive to light. The child was obviously disoriented.

A gastric lavage with 3 percent tannic acid solution was performed. Phenobarbital sodium, 200 mg. was administered intramuscularly.

Several hours later, when supportive treatment appeared ineffective, an exchange transfusion with 1500 ml. of whole blood was carried out over a period of two hours. After the transfusion was completed, the body temperature had risen to 104.8°. This elevated temperature was lowered by means of cold sponging. The child's condition was considerably improved by the following day.

It is of interest to note in the recent literature* other selected cases of acute poisoning treated by exchange transfusion.

A 2½ year old boy became comatose with loss of lid and corneal reflexes after ingestion of 17 to 20 100 mg. capsules of Nembutal. He was unimproved after gastric lavage and symptomatic treatment. Vital signs returned during exchange of 2290 ml. of whole blood, and he seemed normal the next day.

A 3 year old girl became cyanotic and lethargic after ingesting the contents of a bottle of Pyridium. Her condition was deteriorating after gastric lavage and oxygen therapy. Her blood revealed 40 Gm. methemoglobin/100 ml. Exchange of 2000 ml. of whole blood was well tolerated and she was asymptomatic the next day.

A 28 month old girl had a blood salicylate level of 160 mg. 6 hours after ingestion of an undetermined amount of aspirin. Signs of intoxication were progressive after gastric lavage and intravenous fluid therapy. An exchange of 1000 ml. of whole blood was followed by uneventful convalescence.

*Bruton, O. C.: *U. S. Armed Forces M. J., 9*:1128 (August) 1958.

News

Sister Mary John Honored

Sister Mary John, R.S.M., was awarded an honorary Doctor of Science degree at the University of Toledo Commencement Exercises on June 6. Sister Mary John was cited for her outstanding contributions to the community and her profession. Dean Charles H. Larwood of the College of Pharmacy presented Sister Mary John to President William S. Carlson of the University of Toledo. In the citation, reference was made to Sister Mary John's participation in hospital pharmacy activities, her work with the Toledo Academy of Medicine, and her many contributions to her own institution.

Sister Mary John has been Chief Pharmacist at Mercy Hospital in Toledo for many years. She served as Treasurer of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS for several years and was the 1957 recipient of the H. A. K. Whitney Award.

Sister Mary John talks with President William S. Carlson, University of Toledo, prior to the academic session for the Commencement Exercises

ASHP Past President George Archambault receives Honorary Doctor of Science Degree from the Massachusetts College of Pharmacy. Shown in photo left to right are: Professor Joseph H. Goodness who presented Dr. Archambault, and Dean Howard Newton

Archambault Honored

George F. Archambault, a past-president of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, was presented an honorary degree at the Commencement Exercises of the Massachusetts College of Pharmacy on June 2, 1960. The presentation, from Dr. Archambault's Alma Mater, was made by Samuel M. Best, President of the College. In presenting the degree, the following citation was read:

George Francis Archambault, Graduate in Pharmacy, Pharmaceutical Chemist, Bachelor of Laws, Doctor of Science, outstanding pharmacist and administrator. By his distinguished service in the field of hospital pharmacy he has merited the degree of Doctor of Pharmacy, *honoris causa*.

Dr. Archambault, who is Chief of the Pharmacy Service, U. S. Public Health Service, Washington, D. C., is well known to hospital pharmacists and is currently serving on the Council of the American Pharmaceutical Association.

Paul Magalian to VA Central Office in Washington

Paul Magalian, formerly Chief Pharmacist at Kennedy Veterans Administration Hospital, Memphis, Tennessee, recently transferred to Veterans Administration Central Office, Washington, D.C., in the office of the Director, Pharmacy Service.

Mr. Magalian replaced Carl S. Lerner, who transferred to the position of Chief Pharmacist at the new Veterans Administration Hospital in Palo Alto, California. Mr. Lerner had served in VA's Central Office for the past two years as a Pharmacy Specialist and Field Supervisor.

While in Memphis, Mr. Magalian served as Program Chairman of the Memphis Branch of the A.Ph.A. in 1959, and as its Secretary in 1960. He previously had been Chief Pharmacist at the Veterans Administration Hospital, Cleveland, Ohio. While there he

served as Vice President and Program Chairman of the Cleveland Society of Hospital Pharmacists in 1957 and 1958, and was the Cleveland Society's President in 1958-1959.

Edward Superstine Accepts Position in Israel

Edward Superstine, Chief Pharmacist at the Metropolitan Hospital, Detroit, Michigan, and Special Instructor in Pharmacy at Wayne State University College of Pharmacy, has accepted an appointment as Director of Pharmacies of the Rothschild-Hadassah University Hospitals of the Hebrew University, Jerusalem, Israel. Mr. Superstine will assume his responsibilities in the new post, effective September 1, 1960.

Friends and colleagues of Mr. Superstine have begun arrangements for a testimonial dinner to be held in his honor, prior to his departure for Israel.

A native Detroiter, Mr. Superstine received a Bachelor of Science degree in Pharmacy from the College of Pharmacy of the Detroit Institute of Technology (now merged with Wayne State's College of Pharmacy) in 1949, following wartime service as a Pharmacist Mate in the U.S. Navy. He holds the Master of Science degree from the University of Michigan (1953), where he majored in hospital pharmacy, and completed certificate requirements for pharmacy internship at University Hospital in Ann Arbor.

In addition to retail pharmacy experience, Mr. Superstine was associated with the Assia Pharmaceutical Laboratories, Israel from late 1949 through 1950. In 1953, he was Assistant Chief Pharmacist at the Duke University Medical Center, Durham, North Carolina. Later, he was associated with the Hospital Division of the West Chemical Company, Long Island City, New York.

Married, the 34 year-old Superstine is the father of two daughters and a son. Mr. Superstine is presently President of the Alumni Association of the College of Pharmacy of Wayne State University, and is a member of the Greater Detroit Committee on Careers in Pharmacy. He is a member of the American Pharmaceutical Association, the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, the Rho Chi Society, Alpha Zeta Omega Fraternity, and a past president of the Michigan Society of Hospital Pharmacists. Mr. Superstine also holds membership in the American Institute of the History of Pharmacy and the International Pharmaceutical Federation.

► THE CANADIAN SOCIETY OF HOSPITAL PHARMACISTS will sponsor an Institute on Hospital Pharmacy at the University Hospital, Saskatoon, Saskatchewan, Canada, August 12, 13, and 14, 1960. Cooperating groups include the Canadian Foundation for the Advancement of Pharmacy, the Canadian Conference of Pharmaceutical Faculties, and the Saskatchewan Branch of the Canadian Society of Hospital Pharmacists. Some of the topics scheduled on the program include Administration for Hospital Pharmacy, Assessing Drug Quality, Education for the Hospital Pharmacist (a joint session with the Canadian Conference of Pharmaceutical Faculties), Provincial Hospital Insurance Plans, and papers on new drugs.

New England Hospital Pharmacists Meet for Seminar

The Sixth Annual Seminar Program of the New England Council of Hospital Pharmacists was held this year on May 24 and 25 at the Massachusetts College of Pharmacy, Boston. Seventy-eight registrants from the six-state area participated in the sessions and heard speakers of national prominence.

Among the topics presented were the following: central service and administration; educational training; poison control centers; chelate chemistry; cancer chemotherapy; viruses; publications; formularies. The speakers included: Mr. Milton W. Skolaut, National Institutes of Health; Dean Harold G. Hewitt, University of Connecticut College of Pharmacy; Dr. William E. Hassan, Peter Bent Brigham Hospital; Dr. Thomas Hall, Harvard Medical School; Robert D. Lowry, New England Deaconess Hospital; and Professors William O. Foye and Raymond W. Vander Wyk, Massachusetts College of Pharmacy.

A highlight of the two-day seminar was the annual banquet on Tuesday evening, May 24, at the Hotel Kenmore. Honored at the banquet was Carl S. Preble, Chief Pharmacist at the 300-bed Eastern Maine General Hospital in Bangor. Mr. Preble, who is 87 years old, is believed to be the oldest practicing hospital pharmacist in the United States. His professional career spans a period of 70 years.

John Webb, President of the Massachusetts Society of Hospital Pharmacists, presents a special citation to Mr. Carl S. Preble

News

FDA Program for Reporting Adverse Reactions to Drugs

A program for the reporting of unusual or adverse reactions to drugs was recently announced by the Food and Drug Administration. It will be conducted initially with a limited number of hospitals selected to represent a cross section of medical specialties. Where necessary, contracts may be negotiated with the hospitals (or individual physicians designated by them) providing for reimbursement. As the program develops, it is planned that additional hospitals will be included with the aim of establishing nationwide reporting. The project is an outgrowth of a voluntary pilot study carried out during the past four years in cooperation with the American Association of Medical Record Librarians, the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, the American Medical Association, and the American Hospital Association.

The program is designed to develop information promptly on the untoward effects of drugs, especially the newer drugs. The information will be utilized by FDA in the resolution of medical and administrative problems under the Federal Food, Drug and Cosmetic Act.

Prior to release for general use, new drugs are required to be evaluated from the standpoint of safety by the Bureau of Medicine of the Food and Drug Administration. Notwithstanding a most careful check of the submitted data, wide clinical use may bring to light effects not apparent in the investigative studies. When these become known, appropriate measures are taken to afford a greater degree of patient protection. Remedial steps necessary on the part of the drug manufacturer or distributor may vary from a change in the labeling, alerting physicians and others responsible for patient care, to a complete removal of the drug from the market.

The Food and Drug Administration has previously had to rely on the published literature and sporadic reports from physicians, institutions and pharmaceutical manufacturers to supplement its own small staff in following up on experience with new drugs.

► DR. ROBERT P. FISCHELIS has recently been named a special part-time consultant to the Bureau of Public Assistance of the Social Security Administration, U.S. Department of Health, Education, and Welfare. Miss Kathryn D. Goodwin, Director of the Bureau, announced Dr. Fischelis' appointment. He retired as Secretary and General Manager of the American Pharmaceutical Association last August.

In his new post, Dr. Fischelis will study the various administrative methods now pursued by state welfare departments in states which include drugs among the medical-care items provided under the public assistance programs. Plans are being made for Dr. Fischelis to visit some of the regional offices of the Bureau and selected state welfare departments in order to gain first-hand information about the provision of drugs as a part of medical care in public assistance.

It is expected that Dr. Fischelis will evaluate the present procedures for supplying drugs and pharmaceutical services and make such recommendations as may be indicated by his observations.

Dr. Fischelis, a member of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, is well known to hospital pharmacists not only for his work in the A.Ph.A. but also in connection with establishing the Division of Hospital Pharmacy and serving as chairman of the Policy Committee of the Division of Hospital Pharmacy.

► GEORGE F. ARCHAMBAULT, Division of Hospitals, U. S. Public Health Service, Washington, D. C., was a speaker for the Annual Convention of the Indiana Pharmaceutical Association meeting in French Lick on June 21. His subject was "The Servicing of the Smaller Community Hospitals by Retail Pharmacists."

Unpublished Abstracts

Unpublished Abstracts of Articles on Pharmaceutical Subjects is a series of mimeographed booklets compiled by faculty members at the University of Texas School of Pharmacy headed by Dean Henry M. Burlage. The 10th Series has recently been made available and can be acquired through the College of Pharmacy, the University of Texas, Austin, Texas. Copies of Series 1, 2, 3, and 4 are available at $1.00 each; copies of Series 5, 7, and 9 at $1.50 each; Series 6 and 8 at $2.00 each; and Series 10 at $2.50. The prices are intended to cover printing and mailing costs. The following statement, appearing as the Forward for Series 9, will give background on this work:

"In 1948, *Pharmaceutical Abstracts,* published by the American Pharmaceutical Association, was discontinued. This publication, at that time, was the most comprehensive abstract work on published pharmaceutical papers in the English language, and its discontinuance has created a serious gap in the bibliography on pharmacy. In the area of pharmacy administration, there is no known concerted effort at this time to collect a bibliography, although efforts have been made in other areas in the pharmacy curriculum.

"The area of pharmacy administration has shown a need for a comprehensive bibliography of the literature available relative to the operation of a pharmacy.

It was therefore suggested that an initial effort toward securing such a bibliography should be made in the form of a collective listing of articles appearing in the pharmaceutical press which might be suitable for use in this area of instruction.

"The period covered in Series 3 (1-152) is for the year 1957, Series 4 (153-237), the first six months 1958, Series 5 (238-330) the last six months 1958, Series 7 (331-398) for the first six months 1959 and this listing Series 9 (399-505) the last six months 1959. The subject headings adopted, with minor exceptions, are those suggested by Dr. Floyd A. Grolle in 1956 at the Teachers' Seminar on Pharmacy Administration of the American Association of Colleges of Pharmacy."

Wisconsin Preceptor Training Institute Held

The first full-day Preceptor Training Institute, held May 4th at the University of Wisconsin, attracted 147 pharmacist registrants. Wisconsin pharmacists certified as Preceptors in Pharmacy and wishing to maintain their certification, and others desiring to become certified, were invited. The Institute was sponsored by the Wisconsin State Board of Pharmacy and Extension Services in Pharmacy of the University.

Two papers, "The Preceptor-Intern Relationship" from the viewpoint of the educator, and "The Preceptor-Intern Relationship in the Medical Profession," were presented during the morning session.

Professor Howard E. Wakefield of the UW Extension School of Education and Dr. Robert Parkin, Associate Director of Medical Training Programs of the V.A., presented the papers.

Paul Pumpian, Secretary of the Wisconsin State Board of Pharmacy, spoke at the luncheon on "The Need for an Effective Internship Program."

Separate sessions were held in the afternoon for those in retail pharmacy and those in hospital pharmacy. Pharmacy operation and management, prescription department operation, and legal and moral professional responsibility were specifically discussed. Also, pharmaceutical manufacturing was considered at the hospital pharmacy session.

Hospital and retail pharmacists from throughout the state presented these papers to their respective sections. These pharmacists were certified as Preceptors in Pharmacy at an earlier date and expressed their views on how the Preceptor could more effectively train his intern.

The proceedings of this Institute will be published in the October 1960 Monthly Bulletin of Extension Services in Pharmacy according to Richard S. Strommen and will be available on request at that time.

► EDWARD SUPERSTINE, Chief Pharmacist at Metropolitan Hospital in Detroit, Michigan, has recently been named President of Wayne State University's College of Pharmacy Alumni Association.

► OTMAR M. NETZER, formerly a staff pharmacist at University Hospital, Ann Arbor, Michigan, has recently been conferred the Doctor of Pharmacy Degree by the School of Pharmacy, University of California Medical Center, Berkeley, California. Mr. Netzer is a native of Switzerland and has practiced pharmacy in the United States for a number of years.

► CLIFTON J. LATIOLAIS, President-Elect of the ASHP, has been named the SOCIETY's representative to the Council of the American Institute of the History of Pharmacy for the term which begins with the 1960 Annual Meeting. Mr. Latiolais is Director of Pharmacy Service at the Ohio State University Health Center, Columbus, Ohio.

► DR. IVOR GRIFFITH, President of the Philadelphia College of Pharmacy and Science, has been selected as the 1960 recipient of the Remington Honor Medal, according to a recent announcement by Dr. Hugo H. Schaefer, Secretary of the Remington Medal Award Committee. In making the announcement of the 1960 Remington Medalist, the Award Committee cited Dr. Griffith's accomplishments as a teacher, lecturer, author and director in the sciences related to pharmacy. Over a period of many years he has been active in numerous pharmaceutical endeavors and served as President of the American Pharmaceutical Association in 1943-1944.

The 1960 Remington Medal Presentation Dinner has been scheduled for Wednesday, December 7, at the Hotel Roosevelt in New York City. Further details of the Dinner will be announced at a later date.

1960 AAAS Meeting

Announcement has been made of the 1960 New York meeting of the American Association for the Advancement of Science. Meetings will be held during the week of December 26 with sessions centered around five hotels including the Commodore, Biltmore, Roosevelt, Belmont Plaza, and Waldorf-Astoria.

The three day pharmacy program of Section Np will be coordinated by the Secretary, Dr. John E. Christian, Purdue University, Lafayette, Indiana. Sessions for contributed papers in hospital pharmacy and the Section's dinner and vice-presidential address by Joseph V. Swintowsky, will be presented on December 27. Two other sessions for papers and a two-session symposium on "The Scientist's Contribution to the Safe Use of Cosmetics," will be held on December 29.

Section Np's entire program will be co-sponsored by the American Association of Colleges of Pharmacy, American College of Apothecaries, AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, American Pharmaceutical Association, Scientific Section, and the National Association of Boards of Pharmacy.

SELECTED PHARMACEUTICAL ABSTRACTS

and summaries of other articles interesting to hospital pharmacists

edited by CLIFTON J. LATIOLAIS, HENRY J. DEREWICZ *and* LEO F. GODLEY

TABLET COMPRESSION

A Contribution to Powder Compaction Theory by the Pressing of Regular Arrangements of Spheres, Train, D. and Carrington, J. N., J. Pharm. and Pharmacol. 11(Suppl.):261T (Dec.) 1959. (Department of Pharmaceutics, School of Pharmacy, University of London, Brunswick Square, W. C. 1.)

Regular arrangements of annealed phosphor bronze spheres have been used to investigate the lubricating effect of graphite films located in the various parts of the system being compressed in a cylindrical die. The relative importance of interparticulate lubrication and of die wall lubrication are discussed. The influence of the "angle of packing" on the pressing behavior has been investigated using similar arrangements of spheres but varying the diameter of the upper layer. These experiments support the suggestion that the effect on die wall friction of a change in the interparticulate coefficient of friction is small compared with the changes in the coefficient at the die-wall itself. An effect of the lubricant on the consolidation of the system was evident only at certain stages of the compaction process. This would account for the conflicting evidence on this point which has been reported in the literature. It would appear that die wall friction calculations for powders should include a factor for particle deformation and interparticulate frictional effects.

JAMES W. STOVER

DRUG DETERIORATION

Application of Radioactive Isotopes to Studies of Drug Deterioration, Schiffman, R. and Christian, J., J. Am. Pharm. Assoc., Sci. Ed., 49:59 (Jan.) 1960 (Research Laboratories of the Bionucleonics Dept., Purdue University, Lafayette, Ind.)

Radioactive isotopes and tracer techniques suggest a method of study for determination of stability and shelf life. Great ease of detection and sensitivity are afforded when these elements are employed. These advantages can be observed even when working with the most complex mixtures. The article describes the application of radioactive C-14 to the study of deterioration of acetylsalicylic acid. A method was developed in which electrophoretic separation and identification of the thermal products of acetylsalicylic acid degradation were made possible. Procedures used in this study were not of a quantitative nature. Application of radioactive tracers was described as being capable of detection of even the most minute amounts of breakdown products. It was also stated that it is possible to determine the rate of breakdown without identifying the breakdown products or even knowing the mechanism of degradation.

THOMAS E. ARKINSON

ETHYLENE OXIDE STERILIZATION

An Indicator Control Device for Ethylene Oxide Sterilisation, Royce, A. and Bowler, C., J. Pharm Pharmacol. 11(Suppl.):294T (Dec.) 1959. (Microbiology Division, Standards Dept., Boots Pure Drug Co. Ltd., Nottingham, England).

The death of an organism exposed to ethylene oxide depends among other things on the gas concentration surrounding it, the temperature, and time. Thus, if gas is sorbed by material in the sterilizer, the concentration available to kill organisms is lowered and a consequently longer time will be required. A simple disposable sachet to indicate the attainment of lethal conditions has been devised. It consists of a sealed polythene envelope 1 in. wide, 2 in. long and 0.005 in. thick containing saturated aqueous magnesium chloride solutions containing 0.004% bromphenol blue, acidified with hydrochloric acid so that 5 ml. of the solution is equivalent to 3 ml. of 0.1 N HCl using bromphenol blue as indicator. Upon exposure to ethylene oxide under conditions considered adequate for sterilization, the solution quantitatively absorbs ethylene oxide to form ethylene chlorhydrin, the reaction of the solution becoming more alkaline, changing color from yellow to purple. The specifications of the sachet can be varied to produce a sachet which will indicate various degrees of exposure to ethylene oxide. A means of measuring the actual effect of the ethylene oxide process at any point with a fair degree of accuracy can be a very valuable tool, in the designing or evaluation of sterilization processes. The principle can be applied to many other gases and to gas treatments other than sterilization treatments. Patent applications have been filed, and various of these controls are now available.

JAMES W. STOVER

STABILITY OF ASPIRIN SUSPENSIONS

The Stability of Acetylsalicylic Acid in Suspension, Blaug, Seymour M., Wesolowski, Jeremii W., J. Am. Pharm. Assoc. Sc. Ed., 48:691 (Dec.) 1959. (College of Pharmacy, State University of Iowa, Iowa City, Iowa)

In this investigation the kinetics of acetylsalicylic acid suspensions were studied along with the effects of various additives on the stability of the suspensions. The rate of hydrolysis of acetylsalicylic acid suspensions with respect to temperature and concentration was first observed. For zero-order reactions, the more concentrated suspensions showed a longer half-life. Various techniques as well as formulations were experimented with and tested for stability. The most successful additive to the stability of the aqueous aspirin suspension was 50% (W/V) crystalline sorbitol. It raised the half-life of an aqueous suspension containing 6.5 Gm. of acetylsalicylic acid in 100 ml. of water from 1748 hours to 3396 hours at 25°. However, there is still much yet to be done in the way of finding a satisfactory means of preventing or containing hydrolysis of acetylsalicylic acid in aqueous solutions.

ROBERT P. MCMAHON

DETERMINATION OF MEBROBAMATE

An Improved Colorimetric Method for the Determination of Meprobamate in Biological Fluids, Hoffman, Allan J., Ludwig, B. J., J. Am. Pharm. Assoc. Sc. Ed., 48:740 (Dec.) 1959. (Wallace Laboratories, Div. of Carter Products, Inc., New Brunswick, N.J.)

Presentation is made of a simplified and improved modification of a highly specific method for the colorimetric microdetermination of meprobamate in biological fluids. This method is demonstrated in its application to a series of blood concentration and urinary excretion studies conducted on adult human subjects. Meprobamate is extracted from plasma or serum using mixed chloroform-carbon tetrachloride solvent, and color development is effected by treatment with p-dimethylaminobenzaldehyde and antimony trichloride in acetic anhydride. The color intensity measured at 550 mu is proportional to the concentration over the range of 0.5 to 10 mcg. A suitable modification of the extraction procedure for use with urine specimens is also described, which permits separation of meprobamate from the higher concentration of endogenous interfering substances present in urine. Determination of meprobamate concentrations in blood specimens from normal adult subjects indicates that a peak concentration of this drug is attained about 2 hours after oral administration.

ROBERT P. MCMAHON

pH AND ANTIFUNGAL ACTIVITY

Effect of pH on the Antifungal Activity of Undecylenic Acid and Its Calcium Salt, Prince, H. N., J. Bact. 78:788 (Dec.) 1959. (Microbiological Laboratories, Research Department, Wallace and Tiernan, Inc., Belleville, N.J.)

Fatty acids exert a fungistatic and fungicidal action on dermatophytes. Optimal activity is associated with low pH, whether for inhibition of growth or for inhibition of respiration. Various authors have suggested that at any pH the antifungal activity is due to the undissociated molecule alone. Accordingly, the effect of pH on the antifungal activities of undecylenic acid (a long chain fatty acid) and its calcium salt was studied, with parti-

cular attention paid to the concentration (calculated) of undissociated acid at each pH. The antifungal activities of both the acid and salt were similar when tested against a variety of pathogenic fungi at pH 4.5 to 6.0. Above pH 6.0 the calcium salt was inactivated to a greater extent than the free acid. Within the limits of experimental error, the minimum inhibitory concentration of undissociated undecylenic acid remained constant over the range pH 4.5 to 6.0. From pH 6.5 to 9.0, with *Trichophyton mentogrophytes* as the test organism, the antifungal activity of undecylenic acid did not bear a simple relation to the concentration of undissociated acid.

DAVID BURKHOLDER

PANTHENOL

Panthenol in Cosmetics, Rubin, S. H., Magid, L., Scheiner, J., Drug and Cosmetic Industry 86:42 (Jan.) 1960. (Hoffmann-La Roche Inc.)

Panthenol, the alcohol analog of pantothenic acid, is a stable biologically active form of pantothenic acid, a vitamin of the B-complex group essential for the growth and normal maintenance of the skin and hair. In experimental animals, one of the main effects of a deficiency of pantothenic acid is the development of lesions of the skin or hair. Ample evidence is available to demonstrate the conversion of panthenol to pantothenic acid after topical application. Panthenol has been used successfully as a healing agent in the treatment of a variety of skin disorders in the form of topical preparations. In view of the evidence that panthenol penetrates the skin, and that topical application provides a safe, beneficial treatment of various skin conditions, the incorporation of panthenol into skin creams, lipsticks, after-shave lotions and hair preparations is justified. Panthenol can be incorporated into standard cosmetic formulations with no adjustments other than maintaining the pH conditions for the optimum stability of the vitamin compound. The properties and toxicology of *d*- and *dl*-panthenol as regards their applications in cosmetic preparations are presented.

A. GORDON MOORE

HIDDEN COSTS

Hidden Costs Unmasked, D'Angelo, A. J., Drug and Cosmetic Industry 86:36 (Jan.) 1960. (Smith Kline & French Laboratories.)

The subject of costs, both hidden or otherwise, is one that should be constantly dealt with whether business is good or bad. Excellent sales and profits should not lead to complacency but should stimulate business concerns to be even more critical of operational costs and procedures. The author proceeds to enumerate the various operations and procedures which should be critically analyzed. Among these are material specifications, purchasing operations, material handling, the processing area, capacities and production rates of machines and equipment, review of yields, and shipping department handling procedures. The use of fancy and expensive individual cartons should be reviewed, especially for prescription items since the ultimate user may never see the carton. Promotional information and merchandise may carry too many frills and costs here should be minimized. Good work planning and scheduling are highly important to economy. A periodic review of control practices should be made. And lastly, the author touches upon the excessive costs of the abuse of the coffee break, excessive tardiness and absenteeism.

A. GORDON MOORE

SHELF LIFE

Prediction of the Shelf Life of Parenteral Solutions from Accelerated Stability Studies, Lachman, L., Bull. Parenteral Drug Assoc. 13:8 (Nov.-Dec.) 1959. (Ciba Pharmaceutical Products, Inc. Summit, N. J.)

In the past, the stability of a new product was evaluated by exposing the product to normal shelf storage conditions for the period of time that the product would generally be stored in the normal market. In recent years the use of accelerated studies of stability as guides for the estimation of normal shelf life of pharmaceutical dosage forms has developed substantially. The problem to date has been the correlation between accelerated data and shelf storage conditions. Predictions of shelf life from accelerated stability studies can be placed on a quantitative basis by the application of certain fundamental physicochemical principles. The author discusses these basic chemical kinetic laws, presents examples of their application in the estimation of the shelf life of new dosage forms from accelerated stability testing, discusses the application of statistical procedures to determine the degree of confidence to be held in the prediction from accelerated data, and to enumerate briefly some of the factors which may influence the stability of injectable solutions either in a positive or negative manner. Examples of pharmaceutical preparations studied were presented and by statistical treatment of data accruing from these studies it was shown that the predicted stability of the formulations at room temperature from accelerated temperature studies were in excellent agreement with the results from storage at room temperature for the predicted time.

A. GORDON MOORE

COMPARATIVE PHARMACOLOGY

Transposition of Drug Studies from Laboratory to Clinic, Beyer, K. H. Jr., Clinical Pharmacology and Therapeutics 1:274 (May-June) 1960. (Merck Sharp & Dohme Research Laboratories.)

The known similarities of organ functions and biochemical dissimilarities among animal species have given stimulus to the recent advancement of pharmacology. The successful transposition of results from the laboratory to the clinic presupposes that the characteristics that determine both action and elimination of that compound in other animals and man are not significantly different.

The author gives two basic principles that determine the likelihood of anticipating a successful extrapolation of results from laboratory animals to man or from experiments performed on animals to clinical therapeutic utility. They are: (1) the more that is known about the performance of the compound under critically defined laboratory conditions, and (2) the closer the more elaborate laboratory experiments simulate the basic clinical conditions, the greater the likelihood that therapeutic utility can be predetermined. In the practical application of this, the author says that the more penetrating the questions that are asked at the laboratory stage, the less one has to guess and the more likely the clinical outlook can be predicted. In this regard the author suggests that the factor of expanded rather than extended studies should be emphasized.

DAVID BURKHOLDER

U.S.P. PARENTERALS

Final Revision Affecting U.S.P. XVI Parenterals, Miller, L. C., Bull. Parenteral Drug Assoc. 13:25 (Nov.-Dec.) 1959.

The author deals with some of the proposed changes and additions to *U.S.P. XVI*. Some changes in titles of parenteral preparations have been made in the direction of greater uniformity. A change in standards has been made limiting the content of epinephrine where it is used as a vasoconstrictor in local anesthetic solutions to no more than 1 to 50,000. Also changes have been made in the standards for glass containers. The class known as Type IV of *U.S.P.* glass has been dropped and two different limits established under Type II. There is also to be provided what is known as "NP" glass which is a general purpose soda lime glass for use in packaging powders, tablets, and liquids for oral administration. This will permit the use of this type of glass instead of Type III for these non-parenteral products. The U.S.P. XVI limit for the transmission of incident light of a given wave length in light resistant containers has been raised from 10 to 18%.

A. GORDON MOORE

MERCURIAL ANTAGONISTS

The Antagonism of the Antibacterial Action of Mercury Compounds Part IV. Qualitative Aspects of the Antagonism of the Antibacterial Action of Mercuric Chloride, Cook, A. M. and Steel, K. J., J. Pharm. Pharmacol. 11(Suppl.):162T (Dec.) 1959. (Department of Pharmaceutics, School of Pharmacy, University of London, Brunswick Square, London, W.C.1.)

The stoichiometric relations between mercuric chloride and the sulphydryl antagonists have been examined. In liquid cultures, cysteine, glutathione, dimercaprol and thioglycollate are effective as inactivators of mercuric chloride in quantities close to the theoretical amounts. When used to revive mercuric chloride-treated cells, larger amounts are needed, and horse serum is ineffective. The results obtained with *E. coli I* suggest it is not as resistant to the action of mercuric chloride over long periods as are gram-positive organisms. Cells treated with mercuric chloride in the presence of a nutrient medium derive some protection from the constituents of the medium. Qualitative experiments show dimercaprol to be the most efficient antagonist and thiogycollate the least. It appears that even the lowest theoretical concentration of dimercaprol prevented mercuric chloride from exerting its action upon bacteria over a certain time.

JAMES W. STOVER

ASSAY OF CORTISONE, HYDROCORTISONE

A Note on the Colorimetric Assay of Cortisone and Hydrocortisone, Ansari, S. and Khan, R., J. Pharm. Pharmacol. 12:122 (Feb.) 1960 (Glaxo Laboratories, Karachi, Pakistan)

A colorimetric method of estimation of cortisone and hydrocortisone in pharmaceutical preparations using 2,6,-di-t-butyl-p-cresol has been simplified in its details of procedure. The two steroids cortisone and hydrocortisone react with this alkaline solution to form yellow-brown and blue colors respectively. This color is then compared against a standard. The authors have modified the method so that a standard curve for concentrations can be obtained. The modified method has been compared with the tetrazolium reagent method of the *United States Pharmacopeia*.

Pharmaceutical preparations studied were skin and eye ointments, lotions, injections and tablets. Preparations of cortisone and hydrocortisone containing penicillin, streptomycin and neomycin were also examined.

THOMAS E. ARKINSON

N.F. PARENTERALS

N.F. XI Parenterals, Powers, J. L., Bull. Parenteral Drug Assoc. 13:29 (Nov.-Dec.) 1959.

The article deals with the present status of the *National Formulary* Revision program, with a special emphasis on injections and drugs intended for injection which will be included in *N.F. XI*. A total of 815 monographs on drugs and preparations have been admitted to *N.F. XI*. Of these, 529 are carry-overs from *N.F. X*, 137 represent *U.S.P.* deletions, and 149 are for heretofore unofficial items. A new two-column format for the *N.F. XI* will reduce the number of pages by about one third compared to previous editions. The author also covers background information on earlier editions of the *U.S.P.* and *N.F.* There will be a total of 67 monographs on injections in *N.F. XI*, 17 representing deletions from *U.S.P. XV*, 21 being new, and 29 being retained from *N.F. X*.

A. GORDON MOORE

ISOTONIC SOLUTIONS

Osmotic Pressure and Tolerance of Injectable Solutions, Setnikar, I. and Paterlini, M. R., J. Am. Pharm. Assoc., Sci. Ed., 49:5 (Jan.) 1960. (Research Dept. of Recordati Laboratorio Farmologico S. P. A., Milano, Italy)

Injectable solutions can be divided into two categories: those which exert osmotic pressure because they do not pass through the cell membrane and those which do pass through the cell membrane and therefore exert no osmotic pressure. Injections of the latter category are hypotonic and must therefore be rendered isotonic before use by the addition of an isotonizing agent, *e.g.* NaCl. The authors have demonstrated that hypertonic solutions are better tolerated than isotonic solutions and, therefore, when preparing an injectable solution of a substance whose osmotic pressure is not known and cannot be determined by biological means, addition of 0.9% NaCl may be added to produce a solution which is well tolerated.

THOMAS E. ARKINSON

OILY CREAM B.P.

The Stability of Oily Cream B.P., Clark, E. W. and Kitchen, G. F., J. of Pharm. and Pharmacology 12:22" (Apr.) 1960. (Westbrook Lanolin Co., Argonaut Works, Laisterdyke, Bradford, 4, England)

Oxidation of Wool Alcohols B.P. in stored Oily Cream B.P. is insignificant and does not affect the stability of the cream, but the method of preparation, and the amount of autoxidation in the wool alcohols used in making the cream, do affect stability. Storage of wool alcohols before use, as a mixture with Liquid Paraffin B.P. or Liquid Lanolin "60" (a solvent segregation product of Anhydrous Lanolin) greatly reduces autoxidation. Liquid Lanolin "60" also acts as an auxiliary emulsifier and imparts stability. Modifications to the official method of preparation are suggested.

AUTHOR'S SUMMARY

PHYSICAL PROPERTIES OF LIPIDS

Physical Properties of Lipids Used in Pharmacy I, Reese, D. R., Chong, C. W., and Swintosky, J. V., J. Am. Pharm. Assoc., Sci. Ed. 49:85 (Feb.) 1960. (Research and Development Division, Smith Kline and French Laboratories, Philadelphia 1, Pa.)

A simple photomicrographic procedure was developed for discerning the physical integrity of lipid substances. Thin films of fats and waxes are prepared in microscope slides. Photomicrographs are taken of their surface and internal structures. The slides are then stored at normal or exaggerated temperatures for any desired period of time. At various intervals, the exact areas appearing in the original photomicrographs are rephotographed and compared with the originals. These permanent records permit detection of subtle changes which occur during aging. These changes which occur may affect the hardness of suppositories, the spreadability of ointments and the absorption of the drug from the dosage form.

This method has three disadvantages: (A) in the dosage forms, the structural integrity of the lipid components may be affected by the other components. Therefore, the films single lipids may not always reflect the changes these lipids would undergo when blended with other lipids or pharmaceutical agents, (B) the causes of crystal changes are difficult to interpret, and (C) the integrity of the sample following storage cannot be predicted from the original observation.

The use of Polaroid film in the Panphot camera microscope permitted rapid development of photomicrographs and also eliminated the need for a photographic darkroom.

W. F. BERTZ

CELLULOSE DERIVATIVES AS EMULSIFYING AGENTS

Water-Soluble Cellulose Derivatives—Uses as Primary Emulsifying Agents, Davies, R. E. M. and Rowson, J. M., J. Pharm. Pharmacol. 12:237 (Apr.) 1960. (Museum of the Pharmaceutical Society of Great Britain, 17, Bloomsbury Square, London.)

A study has been made of the effects of heat, acid and alkali, salts and alcohol on the stability of methyl-, methylethyl- and sodium carboxymethylcellulose emulsions of liquid paraffin. All were stable for 4 to 8 weeks at 40 degrees, but at 80 degrees deteriorated rapidly, the order of decreasing stability being methyl-, methylethyl-, and sodium carboxymethylcellulose emulsions. Heating at 115 degrees for 30 minutes decreased the stability of sodium carboxymethylcellulose, but not of methyl- and methylethyl-cellulose emulsions. Stability in the presence of added substances depended largely on the physical properties of the reaction products. The results are related to the behavior under similar conditions of aqueous dispersions of the three derivatives, and the influence on emulsion stability of dehydration and degradation of the emulsifying agent are discussed.

AUTHOR'S SUMMARY

CURRENT LITERATURE

. . . also calling your attention to the following articles appearing in recent hospital and pharmaceutical journals

. . . . . .

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Gretz, Margaret: Manual Shows How Much a Pharmacist Can Do, *Modern Hosp.* 94:122 (June) 1960.

Kushnir, M. F.: Hospital Organization, *Hosp. Pharm. (Canada)* 13:59 (Mar.-Apr.) 1960.

—Dispensing

Sister M. Victorine: Pharmacy "On the Go," *Hosp. Progress* 41:172 (May) 1960.

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Amicarella, Henry: Pharmacist Makes a Good Purchasing Agent, *Modern Hosp.* 94:128 (June) 1960.

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Anon.: Denmark, Sweden—Sites for FIP General Assembly, *J. Am. Pharm. Assoc., Pract. Pharm. Ed.* 21:360 (June) 1960.

MANUFACTURING

—Equipment

Briner, William H. and Skolaut, Milton W.: For Precision Filtration . . . A New Membrane Filter, *J. Am. Pharm. Assoc., Pract. Pharm. Ed.* 21:287 (May) 1960.

ORGANIZATIONS

Vance, Joe: Southeastern Pharmacists Have Active Annual Meeting, *South. Hosp.* 28:62 (June) 1960.

Anon.: Hospital Pharmacists Discuss . . . Legal Responsibilities . . . Teaching Opportunities (Abstr. of papers presented at Tri-State Hospital Assembly, May 2-4, Chicago) *Hosp. Topics* 38:53 (June) 1960.

DRUG EVALUATIONS

by the Council on Drugs of the American Medical Association

► THE FOLLOWING MONOGRAPHS and supplemental statements on drugs have been authorized by the Council on Drugs of the American Medical Association for publication and inclusion in *New and Nonofficial Drugs*. They are based upon the evaluation of available scientific data and reports of investigations.

The issue of the *Journal of the American Medical Association* from which each monograph has been taken is noted under each monograph. Monographs in this issue of the JOURNAL include those published in the *A.M.A. Journal* for April 2 and April 23, 1960.

Notice

New and Nonofficial Drugs 1960 is now available from your local bookstore and from the publishers, J. B. Lippincott Company, Philadelphia, Pa. This 1960 edition contains monographs of drugs evaluated by the Council on Drugs of the American Medical Association and published in the Journal of the A.M.A. to October 17, 1959. The indexes listed below contain those drugs evaluated and published between October 24, 1959 and April 23, 1960.

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TO DRUGS EVALUATED IN THIS ISSUE

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TO EVALUATED DRUGS AND ARTICLES IN THE FEBRUARY, MARCH, APRIL, MAY AND JUNE ISSUES OF THE AMERICAN JOURNAL OF HOSPITAL PHARMACY.

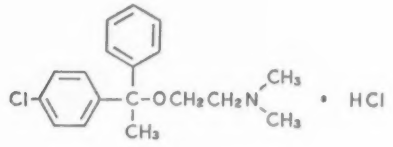
NEW AND NONOFFICIAL DRUGS

The following descriptions of drugs are based on available evidence and do not in any case imply endorsement by the Council.

H. D. KAUTZ, M.D., *Secretary.*

Chlorphenoxamine Hydrochloride — Phenoxene®

CHLORPHENOXAMINE HYDROCHLORIDE (Phenoxene) is 2-(*p*-chloro-α-methyl-α-phenylbenzyloxy) - N,N-dimethylethylamine hydrochloride.—The structural formula of chlorphenoxamine hydrochloride may be represented as follows:



Actions and Uses

Chlorphenoxamine hydrochloride is used in the management of paralysis agitans, in which it displays a pattern of activity similar to that of chemically related histamine antagonists. Thus, in patients responding favorably, it effects a reduction of muscular rigidity and akinesia, improvement in gait and physical endurance, and, by virtue of a mild euphoriant action, alleviation of depression and improvement of the patient's outlook. It appears to have little effect on tremor; the apparent exaggeration of tremor that is sometimes observed is probably secondary to lessening of rigidity. The drug seems to be about equally effective against idiopathic arteriosclerotic, or postencephalitic parkinsonism.

There is no evidence that chlorphenoxamine hydrochloride is superior to a number of older drugs now used in the treatment of paralysis agitans. The major justification for trial of this new agent is the individual variation in response to drugs among different patients; some patients may find chlorphenoxamine more helpful than other drugs. Early reports suggest that few patients will experience optimal alleviation of symptoms with the use of chlorphenoxamine hydrochloride alone and that most will benefit from concomitant administration of other drugs.

No serious toxic effects have been reported; drowsiness and dizziness are the most common minor reactions. Although chlorphenoxamine has been shown to have anticholinergic activity, therapeutic doses apparently do not produce visual disturbances or dryness of the mouth. On the contrary, when the drug has been substituted for atropine-like agents, some patients have complained of excessive salivation. Experimental administration of very large doses to animals produces symptoms suggesting stimulation of the central nervous system, such as nervousness, ataxia, and convulsions. No serious untoward effects have been elicited in chronic toxicity studies.

Dosage

Chlorphenoxamine hydrochloride is administered orally. The initial dosage is 50 mg. three times daily. Thereafter, the dose is regulated in accordance with the response and tolerance of each patient but probably should not exceed 100 mg. three times a day.

Preparations

Tablets 50 mg.

Year of introduction: 1959.

Pitman-Moore Company, Division of Allied Laboratories, Inc., cooperated by furnishing scientific data to aid in the evaluation of chlorphenoxamine hydrochloride.

J. Am. Med. Assoc. 172:1932 (Apr. 23) 1960

Deanol Acetamidobenzoate — Deaner®

DEANOL ACETAMIDOBENZOATE (Deaner) is the *p*-acetamidobenzoic acid salt of 2-dimethylaminoethanol.—The structural formula of deanol acetamidobenzoate may be represented as follows:

Pharmacological Actions

Deanol base is a tertiary amine which differs chemically from the quaternary amine, choline, only by the absence of one methyl group. Compared with choline, however, deanol more readily passes the blood-brain barrier. Deanol has been found to occur in the human brain in free and in bound form. In animals, intensive chronic oral administration of deanol results in excitatory effects on the central nervous system. In mice, the threshold for pentylenetetrazol-induced seizures is reduced, and spontaneous convulsions may occur. However, the thresholds for electrically induced convulsions and for

seizures produced by strychnine are increased. A complex pattern of effects on the central nervous system has also been reported after administration of large intravenous doses of the drug to rabbits and cats.

Single large intravenously administered doses of deanol also produce cardiovascular effects. In anesthetized cats and dogs, blood pressure may be either increased or decreased. The depressor component can be antagonized by atropine; the pressor component has been attributed to release of catecholamines by the adrenal medulla. Under appropriate conditions, stimulation of sympathetic ganglions has also been demonstrated. The intimate mechanism of the central and peripheral effects of deanol remains to be established.

In man, deanol does not produce significant peripheral effects in the clinically recommended doses which are reported to exert effects upon the central nervous system.

Clinical Uses

Deanol is proposed chiefly for the symptomatic relief of a wide variety of vague complaints, such as chronic fatigue, neurasthenia, and neurotic depression. It is also proposed for the alleviation of behavior problems and learning difficulties in school-age children. Besides being poorly defined, these symptoms are characterized by the difficulty in their evaluation, their spontaneous fluctuations, and their great susceptibility to suggestion. So far, the claims that deanol relieves these symptoms are based chiefly on uncontrolled clinical trials. The reported beneficial effects of the drug on mood and behavior remain to be confirmed by fully controlled studies in which placebos are administered. However, comparative studies in which the effects of the drug are contrasted with those of other medicaments appear to indicate a mood-alleviating effect attributable to administration of deanol. The reported influence of the drug on the behavior of children, in particular, appears to justify further study of its action for this purpose.

Toxicity and Side-Effects

Clinical experience to date indicates that deanol is a drug of relatively low toxicity, and no serious side-effects have been noted with doses as large as 900 mg. daily. Occipital headache, constipation, muscle tenseness and spontaneous muscle twitching, insomnia, pruritus, postural hypotension, and weight loss have been reported in some patients. The relationship of these symptoms to the medication is uncertain, although they have been reported to disappear with decreased dosage. Although some benefit from deanol has been reported in children with electroencephalographic evidence of cerebral dysrhythmia, the drug may precipitate grand mal seizures. Accordingly, deanol is contraindicated in patients with grand mal epilepsy or in those with mixed seizures which have a grand mal component.

Dosage

Deanol acetamidobenzoate is administered orally. Dosage is expressed in terms of the free base. Exact dosage for the drug cannot be stated. For adults, the proposed initial dose is 50 mg. daily; the proposed maintenance dosage ranges from 25 to 100 mg. daily. For children of school age with behavioral problems, the proposed initial dose is 75 mg. per day; the proposed maintenance dosage ranges from 75 to 150 mg. per day. Demonstrable effects usually are reported to be achieved only after several weeks of treatment.

Preparations

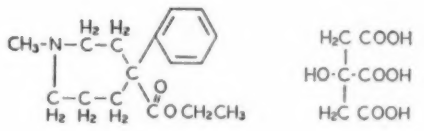
Tablets 25 mg.

Year of introduction: 1958.
Riker Laboratories, Inc., cooperated by furnishing scientific data to aid in the evaluation of deanol acetamidobenzoate.

J. Am. Med. Assoc. 172:1518 (Apr. 2) 1960

Ethoheptazine Citrate — Zactane Citrate®

ETHOHEPTAZINE CITRATE (Zactane Citrate) is 1-methyl-4-carbethoxy-4-phenylhexamethylenimine citrate.—The structural formula of ethoheptazine citrate may be represented as follows:



Actions and Uses

Ethoheptazine citrate is a synthetic, non-narcotic analgesic of moderate potency allied structurally to meperidine. It has been used, in both ambulatory and hospitalized patients, for controlling mild or moderate pain associated with musculoskeletal disorders, such as arthritis, myositis, fibrositis, and ligamental strain; for neurological conditions, including neuritis, sciatica, and tabes dorsalis; for the immediate postpartum and postoperative period; and for the earlier stages of malignant diseases. Headache apparently responds poorly. The drug is ineffective in alleviating severe pain, such as that of myocardial infarction, renal colic, or the later stages of metastatic neoplasia. The analgesic effects of salicylates and ethoheptazine citrate are apparently additive; hence, the conjunctive use of the two may be more effective than either given alone. Such combined usage is especially desirable in rheumatoid arthritis, since ethoheptazine citrate apparently does not share the anti-inflammatory action of salicylates in this and similar conditions, nor has ethoheptazine citrate been shown to possess any antipyretic action.

Estimates of the analgesic efficacy of ethoheptazine citrate vary widely. Some clinicians report that it is about as effective as codeine, although one group has found it to be less effective in postpartum pain than aspirin given in single doses. In the only reported experiment in animals, ethoheptazine citrate was about one-third as active as meperidine.

The incidence of side-effects after usual doses of ethoheptazine citrate is relatively low. Epigastric burning, nausea, vomiting, dizziness, and pruritus are among those most commonly observed. Effects characteristic of opiates, such as sedation, suppression of cough, and depression of respiration, have not as yet been reported. Experimental administration of doses of 1.5 Gm. daily produced in some patients, after several days, symptoms suggesting cumulative toxicity, such as dizziness, visual disturbances, headache, syncope, and nervousness.

All of the experimental evidence and the results of clinical trial support the conclusion that ethoheptazine citrate is completely devoid of addiction liability. Nevertheless, the careless use of the drug is not justified, since experience with other analgesic agents has shown that habituation sometimes becomes apparent only after a drug has been in clinical usage for many years.

The metabolic fate and routes of excretion of ethoheptazine citrate in man are unknown. In animals, parenteral injection produced peak blood levels after about one hour. The drug was generally distributed, but highest concentrations were found in the liver. It was partially excreted by the kidneys, both as the unchanged compound and as hydroxy derivatives and deesterified derivatives. There was some evidence that the intestine was also a major route of excretion.

Dosage

Ethoheptazine citrate is administered orally. The dose is 75 to 150 mg. three or four times daily, and it should be adjusted within this range in accordance with the severity

of the pain and the response of the patient. Larger doses not infrequently produce undesirable side-effects; therefore, if the response to the stated dose is unsatisfactory, another, more potent analgesic may be preferred.

Preparations

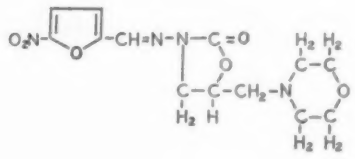
Tablets 75 mg.

Year of introduction: 1958.
Wyeth Laboratories, Division of American Home Products Corporation, cooperated by furnishing scientific data to aid in the evaluation of ethoheptazine citrate.
J. Am. Med. Assoc. 172:1518 (Apr. 2) 1960

Furaltadone

Altafur®

FURALTADONE (Altafur) is 5-(4-morpholinylmethyl)-3-(5-nitro-2-furfurylideneamino)-2-oxazolidinone.—The structural formula of furaltadone may be represented as follows:



Actions and Uses

Furaltadone, a synthetic nitrofuran derivative, is an antibacterial agent. Its proposed use in the treatment of systemic infections distinguishes it from older drugs of related chemical structure, such as nitrofurantoin, which have been used primarily as topical or urinary tract antiseptics in localized infections.

Furaltadone has a moderately broad spectrum of antibacterial activity. Of particular interest is the fact that certain strains of staphylococci thus far tested have proved sensitive and that, in the laboratory, only limited resistance can be induced in these naturally susceptible strains. Diplococcus pneumoniae, Bacillus anthracis, Bacillus subtilis, many strains of Escherichia coli, and species of Clostridium and Vibrio are also highly susceptible, whereas Aerobacter aerogenes, Pseudomonas aeruginosa, Proteus vulgaris, Brucella abortus, Hemophilus pertussis, and species of Salmonella display varying degrees of resistance. The drug is not active against fungi, viruses, trichomonads, or other protozoa.

Clinical reports suggest that furaltadone is a moderately effective antibacterial agent in the treatment of infectious illness; favorable results have been claimed for its use in cellulitis, abscesses, wound infections, otitis media, bronchitis, pneumonia, and other infections caused by susceptible organisms. Correlation between clinical response and sensitivity of the causative organism in vitro is fairly good. The poor results obtained with furaltadone as a urinary tract antiseptic are probably related to the fact that only small amounts of the drug are excreted in the urine. It is without benefit in gonorrhea. Although the ultimate status of furaltadone and its relative value in comparison with other antibacterial agents, including antibiotics and sulfonamides, has not yet been determined, the present evidence suggests that it may find its most important usage in the management of moderately severe infections caused by staphylococci or by susceptible strains of coliform organisms. It is questionable, however, whether sufficiently high blood levels can be attained by oral administration to justify its use as the drug of first choice in severe, life-threatening infections. Furthermore, as with any potent new drug, furaltadone should be used only under circumstances in which the patient can be continuously observed for the development of untoward effects.

Furaltadone is well absorbed after oral administration. The metabolic disposition of the drug is unknown; as previously noted, only small amounts appear in the urine. Although a part is excreted in the bile, this fraction is apparently reabsorbed since little is found in the feces.

Side-Effects

Gastric distress, nausea, vomiting, and diarrhea are the most frequently reported side-effects; the incidence of these symptoms is said to be reduced by giving the drug with meals. Eosinophilia was reported in 30% of the patients in one series. Gastrointestinal bleeding has been reported in one patient. Other untoward effects include maculopapular, vesicular, and urticarial skin eruptions; fever and chills: diplopia; and, in a patient with chronic glomerulonephritis, apparent precipitation of nephrotic syndrome.

Severe leukopenia has occurred in two patients receiving furaltadone and thrombocytopenic purpura in one; in none of these instances, however, could a causative role be ascribed unequivocally to the drug since, in each case, other possible etiological factors were present. In addition, although no cases of hemolytic anemia have been reported, furaltadone has been demonstrated to increase the rate of destruction of transfused tagged erythrocytes from persons abnormally susceptible to drug-induced hemolysis. This observation should be borne in mind, especially when the drug is administered to Negroes or other dark-skinned persons in whom abnormal susceptibility to hemolysis is especially common. In view of the aforementioned consideration, it is recommended that frequent hematological studies be performed on all patients receiving furaltadone.

In patients receiving furaltadone therapy, alcohol has been reported to cause unusual symptoms, including excessive flushing of the skin and dyspnea; consequently, patients should be advised not to ingest alcoholic beverages while receiving the drug and for seven days thereafter. It has been suggested that furaltadone produces this altered responsiveness to alcohol through the same mechanism as does disulfiram.

Moderate doses of furaltadone were well tolerated in chronic toxicity studies in animals. Very large doses, however, produced, in one or more species, hepatic damage, testicular atrophy, polyuria accompanied by a marked increase in the excretion of potassium, and adrenal cortical hypertrophy.

Dosage

Furaltadone is administered orally, preferably with meals, food, or milk. For infections of moderate severity in adults, 250 mg. is administered four times daily. In more serious infections, doses up to twice as great may be given. In children, the dose is proportional to body weight. In infants and younger children, the total daily dosage is 22 to 25 mg. per kilogram of body weight (10.0 to 11.5 mg. per pound) given in four equally divided doses. In older children, the daily dosage is 15 to 22 mg. per kilogram of body weight (7 to 10 mg. per pound).

Furaltadone should not be given to patients who have peptic ulcer or severe impairment of renal or hepatic function.

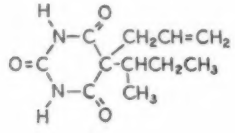
Preparations

Tablets 50 mg. and 250 mg.

Year of introduction: 1959.
Eaton Laboratories cooperated by furnishing scientific data to aid in the evaluation of furaltadone.
J. Am. Med. Assoc. 172:1932 (Apr. 23) 1960

Methoxypromazine Maleate — Tentone Maleate

METHOXYPROMAZINE MALEATE (Tentone Maleate) is 2-methoxy-10-(3′-dimethylaminopropyl)phenothiazine maleate.—The structural formula of methoxypromazine maleate may be represented as follows:



Actions and Uses

Methoxypromazine, a phenothiazine derivative, differs chemically from chlorpromazine only in that the chlorine atom of the latter compound is replaced by a methoxy radical. As might be expected from the chemical relationship, the biological actions of the two compounds are similar. (See the monograph on chlorpromazine hydrochloride in New and Nonofficial Drugs.) Thus, methoxypromazine maleate appears to be a member of that class of central depressants that alleviate anxiety and agitation and suppress aggressiveness, overtalkativeness, and other manifestations of motor excitement, without producing excessive sedation. Methoxypromazine, like meprobamate, finds its greatest usefulness in patients in whom these symptoms occur in mild form as part of nonpsychotic ambulatory psychiatric disorders. In psychotic patients with severe agitation and anxiety or markedly increased psychomotor activity, it is apparently less effective, in equal or even in higher doses, than is chlorpromazine. Thus, although favorable results have been reported in various psychoses, including manic states, delirium, agitated depression, and schizophrenia, many patients in these groups fail to respond. Further clinical trails, and particularly controlled studies, are needed to establish the relative value of methoxypromazine maleate in comparison with other agents now in use in psychiatric practice. The drug has also been used in treatment of various dermatoses associated with anxiety, but the number of reported cases is too small to permit any definite conclusions as to its value.

On the basis of early reports, side-effects seem to be somewhat less troublesome with methoxypromazine than with chlorpromazine, although sedation seems to be somewhat more marked than with the latter. Vertigo, palpitation, dryness of the mouth, constipation, hypotension, skin eruption, and aggravation of preexisting depression have, nevertheless, been reported. The Parkinson-like syndrome sometimes seen with other phenothiazine derivatives is rare and has occurred only when large doses were used. Granulocytopenia and jaundice have not yet been reported with methoxypromazine maleate, but the number of patients in whom it has been studied is too small to justify the assumption that such effects will not appear when it receives more extensive usage. Therefore, all patients receiving the drug should have periodic blood cell counts and should be carefully observed for evidence of other serious toxicity.

The pharmacological effects of methoxypromazine maleate resemble those of chlorpromazine. In experimental animals, the drug interferes with conditioned reflex activity, lowers the threshold for electroshock-induced seizures, potentiates ether and barbiturate anesthesia, produces adrenergic blockade, antagonizes the effects of serotonin, produces hypothermia, has some hypotensive activity, and reduces the volume and acidity of gastric secretion.

Dosage

Methoxypromazine maleate is administered orally. The dosage must be adjusted in accordance with the response and tolerance of the individual patient. An initial dosage of 30 to 100 mg. daily, in divided doses, may be tried in nonpsychotic patients with mild emotional disturbances; more severely disturbed patients may require 200 to 500 mg. per day.

In psychotic patients an initial trial of 200 to 500 mg. daily is suggested. Although some patients have tolerated as much as 1.5 Gm. per day, it has not been clearly established that increasing the dose above 500 mg. per day improves the clinical response.

Preparations

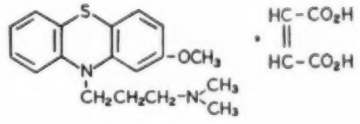
Tablets 10, 25, and 50 mg.

Year of introduction: 1959.
Lederle Laboratories Division, American Cyanamid Company, cooperated by furnishing scientific data to aid in the evaluation of methoxypromazine maleate.

J. Am. Med. Assoc. 172:1519 (Apr. 2) 1960

Talbutal — Lotusate®

TALBUTAL (Lotusate) is 5-allyl-5-*sec*-butylbarbituric acid.—The structural formula of talbutal may be represented as follows:



Actions and Uses

Talbutal, a barbituric acid derivative, is used as a sedative and hypnotic. It apparently has about the same duration of action as butabarbital or pentobarbital and, on the basis of the meager information available, does not appear to differ significantly from the latter or from other barbiturates with a similar duration of action. According to older studies in which white rats and rabbits were used, its efficacy and toxicity are in the upper range of the group. (See the section on barbituric acid derivatives in *New and Nonofficial Drugs*.) The metabolic fate and routes of excretion of talbutal are unknown. Although the drug has had only minimal experimental study with respect to potential toxicity, no serious adverse effects have accompanied its clinical usage over a period of several years. The same precautions applicable to the use of other barbiturates should be observed with talbutal.

Dosage

Talbutal is administered orally. For sedative effects, 30 to 50 mg. is given two or three times a day. The hypnotic dose is 120 mg., given 15 to 30 minutes before the onset of sleep is desired.

Preparations

Tablets 30, 50, and 120 mg.

Year of introduction: 1955.
Winthrop Laboratories, Division of Sterling Drug Inc., cooperated by furnishing scientific data to aid in the evaluation of talbutal.

J. Am. Med. Assoc. 172:1932 (Apr. 23) 1960

The Council has authorized publication of the following report.
H. D. KAUTZ, M.D., *Secretary*

The Registry on Blood Dyscrasias sponsored by the Subcommittee on Blood Dyscrasias of the Committee on Research has received a number of case reports concerning the possible association of a blood dyscrasia with the use of chloramphenicol. The subcommittee has concluded that it might be proper to caution the profession by publishing a reminder concerning the potential ill-effect of this drug on the hematopoietic system. It is hoped that publication of this information will render a service to the medical profession.

NORMAN DE NOSAQUO, M.D., *Secretary,*
Committee on Research.

Blood Dyscrasias Associated With Chloramphenicol (Chloromycetin) Therapy

► WITH AN INCREASE in the receipt of reports by the Registry on Blood Dyscrasias in which chloramphenicol is associated with the development of a blood dyscrasia, it becomes important once more to review briefly the toxic effect of this drug on the blood-forming organs of sensitive persons. The paucity of recent publications in the American literature should not be construed to mean that the reports of chloramphenicol-induced aplastic anemia some years ago were merely a chance association. There have been numerous reports in more recent years of chloramphenicol-induced aplastic anemia in the foreign literature.[1] Between January, 1953, and January, 1960, the Registry on Blood Dyscrasias has received a total of 223 reports of pancytopenia; of these, 97 were cases in which chloramphenicol had been administered. Of the 91 cases, there were 34 instances in which chloramphenicol was reported as being the only drug given.

Severe reactions to antibiotics occurring in patients between late 1955 and early 1957 have recently been studied in a nationwide survey by Welch and colleagues[2] of the Food and Drug Administration, Department of Health, Education, and Welfare. This study reported on 31 patients with aplastic anemia associated with chloramphenicol administration, of whom 23 died. Of these 31 cases, only 8 had been reported to the registry. Although some of these patients may have received chloramphenicol in the presence of a developing aplastic anemia, this explanation seems improbable. It is important to note that, in the survey of the FDA, few cases of aplastic anemia were associated with the administration of penicillin, streptomycin, the tetracyclines, or a sulfonamide.

The Subcommittee on Blood Dyscrasias recognizes that chloramphenicol is a valuable and important addition to a physician's armamentarium. This is particularly true since it has been shown that certain strains of staphylococci resistant to penicillin and the tetracyclines are sensitive to chloramphenicol. The manufacturer has repeatedly directed the attention of the medical profession to the need for judicious use of the drug by a warning statement in the labeling and advertising of the product. Although the warning statement specifically cautions against the indiscriminate use of the drug or against its use for minor infections, an examination of the reports received by the registry reveals that the drug has been used in such conditions as upper respiratory infections, including the common cold, bronchial infections, asthma, sore throat, and tonsillitis, miscellaneous urinary tract and ear infections, undiagnosed low-grade fever, and even disseminated lupus erythematosus, gout, eczema, malaise, and iron deficiency anemia. It is incumbent upon a physician when he prescribes chloramphenicol that he carefully weigh the need for the drug in relation to the risk of possible serious toxic effects.

Although the subcommittee recognizes that chloramphenicol in a valuable antibiotic, it is also the opinion of the subcommittee that there is no longer a reasonable doubt that chloramphenicol may cause aplastic anemia. Periodic blood cell counts may be of some help; however, they cannot be relied on to detect signs of marrow toxicity sufficiently early so that chloramphenicol administration can be discontinued before an irreversible aplastic anemia develops. Therefore, judicious use of the drug must be the rule, and it should not be used prophylactically, in trivial infections, or in infections in which other, less dangerous antibiotics may be used effectively.

References

1. (*a*) Visconti, P.: Sulla mielosi aplastica globale da cloramfenicolo: Contributo clinico, Riforma med. *70*:1043-1046 (Sept. 15) 1956. (*b*) Cable, J. V., and Reid, J. D.: Jaundice and Aplastic Anaemia Following Chloramphenicol Therapy, New Zealand M. J. *56*:532-535 (Oct.) 1957. (*c*) Shaw, R. G., and McLean, J. A.: Chloramphenicol and Aplastic Anaemia, M. J. Australia *1*:352-359 (March 16) 1957. (*d*) Louwette, R., and Lambrechts, A.: La toxicite sanguine du chloramphenicol, Rev. med. Liege *12*:10-16 (Jan. 1) 1957. (*e*) Madsen, N. O.: Anaemia aplastica fremkaldt af chloramphenicol, Ugesk. laeger *119*:489-491 (April 18) 1957. (*f*) Siamone, L.: Sull'emopatia da CAF, Riforma med. *71*:494-498 (March 4) 1957.

2. Welch, H.; Lewis, C. N.; Weinstein, H. I.; and Boeckman, B. B.: Severe Reactions to Antibiotics: Nationwide Survey, Antibiotic Med. *4*:800-813 (Dec.) 1957.

J. Am. Med. Assoc. 172:2044 (Apr. 23) 1960

How To Use A New Drug

► IF YOU DO WISH TO CONSIDER the early use of new agents, select one at a time, carefully evaluate all of the available data on it, and reject its use unless there is clear evidence that it represents a real therapeutic advance. Thorough investigation of a few agents will always prove to be more profitable than cursory examination of many. It is desirable to select products for investigation from among those for which the manufacturer has provided relatively complete bibliography. This simplifies the task, provides some selection on the basis that full information is more apt to be provided for those products in which the manufacturer himself has confidence, and finally, in the long run, such selection may induce manufacturers to provide more adequate information on their products.

—Mark Nickerson and John P. Gemmell: Doctors, Drugs and Drug Promotion, *Canadian Medical Association Journal* (April 1), 1959.

POSITIONS

in hospital pharmacy

PERSONNEL PLACEMENT SERVICE

The Personnel Placement Service is operated without charge for the benefit of hospitals and pharmacist members of the American Pharmaceutical Association and the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. The ultimate purpose is the improvement of pharmaceutical services in hospitals, by more adequately fulfilling hospital pharmacy personnel needs and by locating positions which provide challenging opportunities for pharmacists who have indicated an interest in a hospital career.

By participating in the service, the hospital indicates a desire to achieve a pharmaceutical service which meets the *Minimum Standard for Pharmacies in Hospitals.* A description of the position should be submitted to the Division of Hospital Pharmacy on the forms provided. The hospital will receive applications directly from the applicant. The hospital agrees to reply to each application received and to notify the Division of Hospital Pharmacy when the position is filled.

The pharmacist, by participating, agrees to submit a Personnel Placement Service Information Form to the Division of Hospital Pharmacy. The applicant will then be notified of openings listed with the Service as they become available and can negotiate directly with the hospital if he is interested. It is agreed that the Division of Hospital Pharmacy will be notified as soon as a position is accepted.

A listing of positions open and wanted will be made regularly in the AMERICAN JOURNAL OF HOSPITAL PHARMACY without charge. Neither the name of the hospital offering the position nor the name of the applicant will be listed, except by code. All inquiries should be directed as shown above, including the code number.

Address all inquiries to

Division of Hospital Pharmacy
2215 Constitution Avenue, N. W.
Washington, 7, D. C.

positions open

CHIEF PHARMACIST—190 bed community hospital located in Virginia. Applicant must have administrative ability as well as organizational ability. Must be interested in teaching. Close relationship with medical and nursing staff of the hospital. Forty hour week, vacation, sick leave and retirement plan. PO-211

STAFF PHARMACIST—335 bed general hospital located in Florida. Duties include filling requisitions from nursing stations and a large volume of outpatient prescriptions. Will assist chief pharmacist. Vacation, sick leave, free hospitalization and pension programs. PO-210

ASST. CHIEF PHARMACIST—220 bed general hospital. Will be in charge of pharmacy in chief pharmacist's absence. Qualifications: female, B. S., experience in pharmacy administration, licensed in Pennsylvania. Forty hour week, vacation, progressive personnel policy. PO-209

ASST. CHIEF PHARMACIST—262 bed general hospital. Duties include assisting narcotics security officer, filling and checking prescriptions, prepackaging, and manufacturing pharmaceuticals. Assume responsibility for operation of pharmacy in absence of chief pharmacist. Applicant must have B. S. and be eligible for registration in Indiana. Forty-eight hour week, vacation, sick leave, hospitalization and life insurance. PO-206

STAFF PHARMACIST—500 bed general hospital located in Iowa. Modern pharmacy. Pharmacist will work closely with medical staff and school of nursing. Male or female. Forty hour week, vacation, sick leave, and insurance. PO-205

ASST. CHIEF PHARMACIST—238 bed general hospital located in Michigan. Duties include dispensing, controlling pharmacy divisions on nursing units, and assuming responsibility of pharmacy in the absence of chief pharmacist. Forty hour week, vacation, holidays, and sick leave. PO-204

ASST. CHIEF PHARMACIST—204 bed hospital. Duties include dispensing, receiving, and labeling drugs, etc.; furnishing information to physicians and nurses; teaching student nurses; and being responsible as an assistant department head in administrative and other related duties. Forty hour week, vacation, insurance, and sick leave. Must be eligible for registration in Illinois. PO-203

CHIEF PHARMACIST—104 bed general hospital. Direct pharmacy with the help of full-time registered nurses and assist in the purchase of medical surgical supplies. Forty hour week, vacation and sick leave. Located in a university town in Illinois. PO-202

CHIEF PHARMACIST—46 bed general hospital located on University campus in Washington State. Pharmacist will have charge of pharmacy dept. and will also be the clinical instructor in the College of Pharmacy. M.S. Degree desirable. Forty hour week, vacation, and sick leave. PO-200

STAFF PHARMACIST—280 bed general hospital. Intern and resident program, school of nursing and school of medical technology. Building program to include new pharmacy facilities. Must have B. S. in Pharmacy. Michigan registration required or be eligible for licensure. Recent graduate acceptable. Forty hour week, vacation, insurance, pension plan, holidays, and sick leave. PO-199

ASST. CHIEF PHARMACIST—400 bed private hospital. Duties include filling inpatient, outpatient, and clinic medications, teaching pharmacology to student nurses, and routing hospital compounding. Must be registered in Kentucky. Forty hour week, vacation, and retirement. PO-197

STAFF PHARMACIST—700 bed general hospital. Duties include filling prescriptions for inpatients and outpatients. B. S. required. Must be registered or eligible for licensure in Illinois. PO-196

CHIEF PHARMACIST—300 bed hospital located in Virginia. Pharmacist will have responsibility of organizing dept., purchasing initial stocks, planning policies and procedures, establishing formulary, and serving on Pharmacy and Therapeutics Committee. Forty hour week, vacation, and sick leave. PO-195

STAFF PHARMACIST—790 bed hospital. Duties include handling and filling of inpatient and outpatient departmental orders, outpatient prescriptions and bulk manufacturing. Must be registered or eligible for registration in Ohio. Male preferred. Forty hour week, vacation, holidays, and pension plan. PO-194

ASST. CHIEF PHARMACIST—225 bed general hospital in Hawaii. Assist chief pharmacist; charge of dept. in chief pharmacist's absence. Must be eligible for licensure in Hawaii. Forty hour week, vacation, holidays, annual sick leave, insurance, and retirement plans. PO-191

CHIEF PHARMACIST—2300 bed mental hospital. Pharmacist will have complete charge of pharmacy, drug orders, stocking, dispensing, compounding, necessary records, and other pharmacy duties. Must be licensed in Ohio. Forty hour week, vacation, holidays, insurance, retirement plan, and sick leave benefits. PO-189

STAFF PHARMACIST—325 bed general hospital located in Pennsylvania. Duties include filling requisitions from the various nursing stations for floor drugs and completing specific prescriptions to patients. Forty hour week, vacation, and group hospitalizations. PO-186

STAFF PHARMACIST—400 bed general hospital located in Michigan. Excellent opportunity in an expanding pharmacy program. Liberal benefits. PO-185

CHIEF PHARMACIST—312 bed nonprofit community hospital. Male or female. Must be qualified and eligible for licensure in Virginia. Forty to forty-four hour week, vacation, and insurance plans. PO-181

CHIEF PHARMACIST—264 bed general hospital located in Texas. Plans and directs pharmacy policies, compounds and dispenses medicines, purchases supplies and materials, maintains records, and prepares periodical reports. Must be eligible for or have M. S. Degree. Forty hour week, vacation, retirement, sick leave, and insurance plans. PO-177

STAFF PHARMACIST—290 bed general medical and surgical city hospital. Duties include compounding, dispensing, manufacturing, and assisting in the purchasing of supplies. Prepares reports and maintains records. Furnishes information concerning medications to physicians and nurses. In absence of associate pharmacist will assist with special duties as assigned by chief pharmacist. Male or female between 23 - 45 years of age. Ohio registration required. Hospital pharmacy internship preferable. Forty hour week, vacation, sick leave, retirement plan, credit union, holidays and insurance. PO-170

STAFF PHARMACIST—200 bed general hospital. Duties include compounding, dispensing, and manufacturing. Applicant must have B. S. in Pharmacy and be registered in Connecticut. Recent graduate acceptable. Forty-four hour week, vacation, pension plan, and hospitalization. PO-168

ASST. CHIEF PHARMACIST—102 bed general hospital located in Oregon. Pleasant surroundings in college city of 8,000 - 20,000 students. Male or female. Must be registered. Forty hour week, vacation, holidays, and sick days. PO-166

STAFF PHARMACIST—100 bed general hospital located in Texas. Assume personal responsibility for accurate filling of prescriptions and supplies, assist in inspecting drugs in nursing stations, replace stock taken from night emergency container, inspect and refill ophthalmic solution trays from operating room, emergency room, and central supply. Female preferred. Must be registered or eligible for registration in Texas. Forty hour week, vacation, holidays, and sick leave. PO-164

ASST. CHIEF PHARMACIST—280 bed general hospital. Duties include filling prescriptions and medication orders from various units, supervise pharmacy clerks, assume administrative responsibility when chief pharmacist is absent. Forty-four hour week, sick leave, and holidays. Must be registered in Illinois. PO-161

CHIEF PHARMACIST—103 bed general hospital. Purchasing, receiving and issuing of pharmacy supplies. Taking inventory once a year. Filling out various reports necessary to operation of dept., etc. Must be registered in Washington State. Forty hour week, vacation, holidays, sick leave, and insurance. PO-158

STAFF PHARMACISTS—Unique, new 400 bed general private hospital where pharmacists join the doctor-nurse team by working in a dispensing unit location on each 100 bed nursing unit or in the central pharmacy. The dispensing unit personnel have responsibility for providing drugs, oxygen, dressing trays, I.V. solutions and similar items. A total of sixteen staff pharmacists is required to staff the hospital. Applicants must be eligible for registration in California. Excellent opportunity; generous benefits. PO-148

STAFF OR ASST. CHIEF PHARMACIST—150 bed general hospital located in New Mexico. Generous benefits. PO-134

STAFF PHARMACIST—500 bed general hospital located in Oklahoma. B. S. required. Forty hour week. PO-95

ASST. CHIEF PHARMACIST—237 bed general hospital in West Virginia. Female desired. Forty-four hour week, vacation. PO-77

positions wanted

CHIEF PHARMACIST—Male, married. B. S. Served hospital pharmacy internship. Extensive hospital pharmacy experience. Prefers to locate in the Midwest. Registered in Ohio. PW-263

CHIEF PHARMACIST—Female, single. B. S. Thirteen years' hospital pharmacy experience. Prefers to locate in the Midwest or in the East. Registered in New York. PW-262

STAFF PHARMACIST—Male, single. Obtained B.S. in 1957. Hospital pharmacy experience. Prefers to locate in the East. Registered in Texas and Washington, D. C. PW-261

CHIEF PHARMACIST—Male, married. B. S. Fourteen years' hospital pharmacy experience. Prefers to locate in the East or Midwest. Registered in Pennsylvania and West Virginia. PW-260

STAFF PHARMACIST—Female, single. Obtained B. S. in 1958 at West Virginia University College of Pharmacy. Served hospital pharmacy internship at Duke University Medical Center. Two years' hospital pharmacy experience. Prefers to locate in the Northeast. Registered in West Virginia and North Carolina. PW-259

CHIEF PHARMACIST—Male, married. Received B. S. at Temple University School of Pharmacy in 1938. Completed hospital pharmacy internship at Jefferson Medical College Hospital in 1960. Prefers to locate in East. Registered in Pennsylvania. PW-258

STAFF PHARMACIST—Male, married. Obtained B. S. in 1952 at Purdue University. Hospital experience. Prefers to locate in Ohio or Indiana. Registered in Ohio and Indiana. PW-257

ASST. CHIEF PHARMACIST—Male, single. Obtained B. S. in 1956 at Purdue University. Hospital pharmacy experience. Prefers position with some administrative and/or teaching duties. Would like to locate in Northeast or Southwest section of country. Registered in Texas. PW-256

STAFF PHARMACIST—Female, single. Obtained B. S. in 1959 at Purdue University. Prefers to locate in Indiana. Registered in Indiana. PW-255

STAFF OR ASST. CHIEF PHARMACIST—Female, single. Obtained B. S. in 1952 at the University of Nebraska. Hospital pharmacy experience. Prefers to locate in the East, South or in Hawaii. Registered in Nebraska. PW-254

CHIEF PHARMACIST—Male, single. B. S. obtained in 1952 at the University of Illinois. Served hospital pharmacy internship. Two years' hospital pharmacy experience. Registered in Illinois. Prefers to locate in Arizona. PW-252

STAFF PHARMACIST—Male, single. Will obtain B. S. Degree at Oklahoma University. Prefers Oklahoma or surrounding states. Six months' hospital pharmacy experience. PW-250

CHIEF PHARMACIST—Male, single. Obtained Pharm. D. Degree in 1957 at the University of Southern California. Twelve years' hospital pharmacy experience. Registered in Minnesota and California. Prefers to locate in Minneapolis, Minnesota. PW-249

STAFF OR CHIEF PHARMACIST—Male, married. Obtained B. S. in 1959 at Medical College of South Carolina. Completed hospital pharmacy internship in June, 1960. Registered in South Carolina. Prefers to locate in Pennsylvania, Virginia or North Carolina. PW-248

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained B. S. in 1954 at South Dakota State College. Two years' hospital pharmacy experience. Will locate anywhere. Registered in South Dakota. PW-247

STAFF PHARMACIST—Male, married. Will receive B. S. in June, 1960, at Philadelphia College of Pharmacy and Science. One year's hospital pharmacy experience. Prefers to locate in Philadelphia. PW-246

STAFF OR ASST. CHIEF PHARMACIST—Applicant has held government position as Director of Medical Services in Sierra Leone, West Africa, since 1958. Holds B. S. Degree in Pharmacy from Drake University and has taken special courses in Parenteral Products and Radioisotopes Techniques at Philadelphia College of Pharmacy. Served hospital pharmacy internship at University of Arkansas Medical Center. Additional hospital pharmacy experience in England. Registered in Iowa. PW-245

CHIEF PHARMACIST—Male, married. Ph.C. Degree received at Ohio State College of Pharmacy. Twelve years' hospital pharmacy experience. Will locate anywhere. Registered in Ohio and Hawaii. PW-244

CHIEF PHARMACIST—Male, married. Obtained B. S. in 1953 at Ohio Northern University. Seven years' hospital pharmacy experience. Will locate anywhere. Registered in Ohio. PW-243

PHARMACIST—Male, single. Will obtain M. S. Degree in August, 1960 at State University of Iowa. Four years' hospital pharmacy experience. Prefers to locate in the New York City area. Registered in Iowa. PW-240

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Received M. S. Degree in 1960 at the State University of Iowa. Serving hospital pharmacy internship. Prefers to locate in the East. PW-239

STAFF OR ASST. CHIEF PHARMACIST—Male, married. Obtained B. S. in 1950. Presently working for M. S. Degree at the University of Maryland. Two years' hospital pharmacy experience. Prefers to locate in the East. Registered in Maryland. PW-238

DIRECTOR OF PHARMACY SERVICES—Male, single. Received B. S. in 1956 at the University of California. Served hospital pharmacy internship. Four years' hospital pharmacy experience. Registered in California. Prefers to locate in California. PW-237

ASST. PHARMACIST—Male, single. Obtained B. S. at Xavier University in May, 1959. Will locate anywhere. Registered in Louisiana. PW-235

STAFF OR CHIEF PHARMACIST—Male, married. Obtained B. S. at St. Louis College of Pharmacy. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Prefers to locate in Midwest. Registered in Missouri. PW-234

CHIEF PHARMACIST—Male, married. Obtained B. S. at Massachusetts College of Pharmacy in 1943. Nine years' hospital pharmacy experience. Prefers to locate in East. Registered in Connecticut and Massachusetts. PW-230

PHARMACIST—Male, married. B. S. received at Howard College of Pharmacy in 1956. Served hospital pharmacy internship. Two years' hospital pharmacy experience. Prefers to locate in Florida. Registered in Florida and Alabama. PW-227

PHARMACIST—Female, single. M. S. received at the University of Maryland in 1951. Served hospital pharmacy internship. Five years' hospital pharmacy experience. Prefers to locate in New Jersey. Registered in Pennsylvania and Missouri. PW-225

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B. S. received at Detroit Institute of Technology in 1950. Four years' hospital pharmacy experience. Prefers to locate in Michigan. Registered in Michigan. PW-224

CHIEF PHARMACIST—Male, married. B. S. received at the University of Wisconsin in 1957. Four years' hospital pharmacy experience. Prefers to locate in Wisconsin. Registered in Wisconsin. PW-222

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Received B. S. at Medical College of South Carolina in 1950. Four years' hospital pharmacy experience. Prefers Southeast section of U. S. Registered in North Carolina and South Carolina. PW-221

CHIEF PHARMACIST—Male, single. Received M. S. at University of Michigan in 1957. Six years' hospital pharmacy experience. Served hospital pharmacy internship. Will locate anywhere. Registered in Michigan and Ohio. PW-220

CHIEF PHARMACIST—Male, single. B. S. received in 1952 at Massachusetts College of Pharmacy. Seven years' hospital pharmacy experience. Will locate anywhere. Registered in Massachusetts. PW-218

STAFF OR CHIEF PHARMACIST—Male, single. B. S. received in 1952 at St. Louis College of Pharmacy. Two years' hospital pharmacy experience. Registered in Missouri. Prefers to locate on the West Coast, particularly California. PW-217

CHIEF PHARMACIST—Male, married. Received M. S. at the State University of Iowa. Served hospital pharmacy internship. Registered in Iowa. Prefers to locate in the Northern Midwest. PW-215

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B. S. received in 1954 at the Southwestern State College in Oklahoma. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Registered in Oklahoma. Prefers to locate in Southwest. PW-214

CHIEF PHARMACIST—Male, married. M. S. received at Philadelphia College of Pharmacy and Science in 1957. Served hospital pharmacy internship. Over four years' hospital pharmacy experience. Registered in Nebr., Ky., Iowa, and Pa. Prefers Midwest. PW-204

STAFF PHARMACIST—Female, single. B. S. Seven years' hospital pharmacy experience. Southwest section of country preferred. Registered in Alabama and Georgia. PW-199

ASST. CHIEF OR CHIEF PHARMACIST—Male. B. S. received in 1954. Desires to locate in Michigan, Ohio or Illinois. Registered in Michigan. PW-177

PHARMACIST—Female, Graduate of the University of Idaho, 1954. Registered in Illinois. Hospital experience. Prefers Chicago area. PW-166

CHIEF OR ASST. CHIEF PHARMACIST—Female. B. S. and M. S. Purdue University. Ten years' hospital pharmacy experience. Registered in Indiana and Kentucky. PW-164

PHARMACIST—Male. Registered in Louisiana and Missouri. Experienced. Prefers Midwest. PW-161

ASST. CHIEF PHARMACIST—Male, single. Registered in N. Y. and Vt. Served hospital pharmacy internship, now employed part-time staff pharmacist. Prefers Eastern part of country. Has M. S., four years' hospital pharmacy experience. PW-154

CHIEF PHARMACIST—Male, married. B. S. Ten years' hospital pharmacy experience. Registered in Mass., Ill., Mo., Ky., Tenn., and Va. PW-150

PHARMACIST—Male, single. B. S. received in June, 1959. Prefers to locate in East. PW-149

ASST. CHIEF OR CHIEF PHARMACIST—Single, male. Registered in D. C., Ill., Md., and Pa. Graduate University of Pittsburgh in 1953, experience in research. Prefers North and East. PW-148

ASST. DIRECTOR OR DIRECTOR OF PHARMACY SERVICES—Male, single. B. S. Retail and five years' hospital experience. Registered in Illinois. PW-119

CHIEF PHARMACIST—Female, single. Registered in Pennsylvania and Ohio. Twelve years' hospital experience as chief pharmacist. Desires to locate in Pennsylvania or Ohio. PW-111

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